

A REVIEW OF FIXED INCOME MARKET STRUCTURE

HEARING

BEFORE THE
SUBCOMMITTEE ON CAPITAL MARKETS,
SECURITIES, AND INVESTMENT
OF THE
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U.S. HOUSE OF REPRESENTATIVES
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A REVIEW OF FIXED INCOME MARKET STRUCTURE

Friday, July 14, 2017

U.S. HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON CAPITAL MARKETS,
SECURITIES, AND INVESTMENT,
COMMITTEE ON FINANCIAL SERVICES,
Washington, D.C.

The subcommittee met, pursuant to notice, at 9:20 a.m., in room 2128, Rayburn House Office Building, Hon. Bill Huizenga [chairman of the subcommittee] presiding.

Members present: Representatives Huizenga, Hultgren, Messer, Poliquin, Hill, Emmer, Mooney, Davidson, Budd, Hollingsworth; Maloney, Lynch, Himes, Foster, Sinema, and Vargas.

Ex officio present: Representative Hensarling.

Chairman HUIZENGA. The Subcommittee on Capital Markets, Securities, and Investment will come to order. And we are very, very pleased that we have this great panel ahead of us here.

Without objection, the Chair is authorized to declare a recess of the subcommittee at any time.

Today's hearing is entitled, "A Review of Fixed Income Market Structure." And as I had said to the witnesses, there is Floor activity that is happening right now, so you may see a few Members ducking in and out as they have to go down to the Floor, addressing issues there, or to another meeting, and we will just have to see how we are playing out here with our timing for votes and those kinds of things.

But I deeply appreciate your time here, gentlemen.

At this point, I will now recognize myself for 3 minutes to give an opening statement.

The United States has the deepest, strongest, most liquid capital markets in the world, and the fixed income market is one of the largest sources of capital for issuers and investment opportunities for a broad array of savers and investors. While lesser known to some investors, the fixed income market is nearly twice as large as the equity markets, and it differs significantly. Fixed income serves as a vital source of funding for companies and provides capital for them to grow and create jobs as well as funding for local infrastructure projects such as roads and bridges. Additionally, the fixed income markets help provide opportunities for savers and investors ranging from first-time home buyers to seniors seeking opportunities for a more stable stream of income.

According to the Securities Industry and Financial Markets Association, the total outstanding fixed income debt is nearly \$40 tril-

lion, with a “T,” with new issuances between \$6 trillion and \$7 trillion per year over the last 5 years. On average, \$775 billion of securities are traded each and every day.

Today’s hearing will focus on the current market structure and potential ways to improve the transparency, liquidity, efficiency, and other aspects of fixed income markets. Since fixed income markets are different than equity markets, they should have a regulatory structure that appropriately reflects the market’s unique characteristics.

We will review both the current domestic and international regulatory regime for fixed income markets, liquidity, data transparency for fixed income asset classes, and increased deployment of technology and electronic trading platforms in fixed income products.

Our witnesses will also review components that are working well in the fixed income market, components that need improvement, and components that may negatively impact the market’s optimal functionality. The objective of this hearing is to provide this subcommittee with the background and foundation to examine the optimal design of the fixed income market based on today’s market conditions.

In a July 12th speech, I was pleased to hear Securities and Exchange Commission Chairman Jay Clayton say, “The time is right for the SEC to broaden its review of market structure to include specifically the efficiency, transparency, and effectiveness of our fixed income markets. As waves of Baby Boomers retire every month and need investment options, fixed income products, which are viewed as a stable place to store hard-earned money, will attract more and more Main Street investors. The Commission must explore whether these are as efficient and resilient as we expect them to be, scrutinize our regulatory approach, and identify opportunities for improvement. To that end, I have asked the staff to develop a plan for creating a fixed income market structure advisory committee, like the EMSEC. This committee would be made up of a diverse group of outside experts who will be asked to give advice to the Commission on regulatory issues impacting fixed income markets.”

I can just say this: Bravo.

This is an area where we can put partisan politics aside, and I believe that the SEC and Congress can work together to make sure that the fixed income market is performing optimally for all investors and the economy.

I look forward to hearing from our witnesses today.

At this time, the Chair now recognizes the ranking member of the subcommittee, the gentlelady from New York, Mrs. Maloney, for 5 minutes for an opening statement.

Mrs. MALONEY. I thank the gentleman for calling this important oversight committee. And we have an outstanding group of panelists today.

This hearing will address the market structure of the corporate bond market, the Treasury market, and the municipal bond market. Bond markets are incredibly important to our economy. The corporate bond market allows companies of all sizes to raise capital to expand their businesses, hire more employees, or invest in new

equipment. And the Treasury and municipal bond markets allow governments to finance their day-to-day activities at a very low cost to taxpayers.

U.S. companies raised over \$1.5 trillion in the bond markets in 2016, the fifth consecutive year of record issuance, and the Federal Government raised about \$2.2 trillion in the Treasury market in 2016. With so much money at stake, it is important to ensure that the secondary market for these bonds is robust and efficient.

A couple of weeks ago, this subcommittee examined the market structure of the U.S. stock market, so it is only logical that we also examine the structure of the bond markets as well. And what we find is that the market structure of these markets, the stock market and the bond markets, are as different as night and day. The stock market is a highly electronic, mostly exchange-traded market, made up of mom-and-pop retail investors, institutional investors like mutual funds and pension funds, banks, and brokers, and high-frequency trading firms. Trades in the stock market happen so fast that they are measured in microseconds, which is one one-millionth of a second. This is largely because stocks are highly standardized. One share of Apple is interchangeable with another share of Apple, and there are so many shares outstanding.

In contrast, the corporate bonds are not standardized at all. A big U.S. company, like GE, has around 900 different bonds outstanding, each with different terms, maturity dates, so trading is much more fragmented in corporate bonds.

As a result, corporate bonds don't trade on centralized exchanges like stocks. Instead, they trade through banks acting as dealers. Dealers hold large inventories of bonds so that when an investor like a mutual bond wants to buy a particular corporate bond, the dealer can sell them and that bond out of its own inventory. So, in corporate bonds, it is the dealers who are responsible for maintaining an orderly liquid market.

The structure of the Treasury market is somewhere in between the stock market and the corporate bond market. Treasuries are much more standardized than corporate bonds. All Treasury bonds are issued by the same issuer. The Treasury Department and the terms are not customized. The Treasury Department mostly issues the same 2-year, 5-year, 10-year, and 30-year bonds over and over again. Because of this standardization, the Treasury market has become significantly more electronic and significantly faster in the past decade.

It is still a dealer-based market like the corporate bond market, but those dealers now include a lot of high-frequency trading firms. And when dealers trade with each other, it is done almost entirely electronically now. But when dealers trade with their customers, the mutual funds and pension funds that buy and hold Treasury securities, they still trade over the phone like in corporate bonds. This trend toward more electronic, high-speed trading in trading and Treasuries has likely made the Treasury market more efficient but also more fragile, which is worrying.

But I want to make two points before we hear from our witnesses. First, for all its flaws, the Treasury market is still the largest, deepest, and most liquid bond market in the world. This allows

the Federal Government to borrow at extremely low interest rates, which ultimately saves money for taxpayers.

So we need to be very careful before we make changes to the Treasury market, because if we get it wrong, then taxpayers will end up footing the bill.

Second, the corporate bond market has never been and likely never will be a very liquid market. So while it is important to monitor the health of this market, we shouldn't fool ourselves into believing that corporate bonds will ever be anywhere near as liquid as stocks or even Treasury bonds.

With that, Mr. Chairman, I look forward to hearing from our witnesses, and I thank you for holding so many substantive and important oversight hearings.

Chairman HUIZENGA. The gentlelady yields back.

The Chair now recognizes the vice chairman of the subcommittee, the gentleman from Illinois, Mr. Hultgren, for 2 minutes.

Mr. HULTGREN. I would also like to thank Chairman Huizenga for holding so many important hearings. It has been a busy couple of days, but it's really important for us to tackle the challenges facing our markets, especially reassessing some of the policy responses made by Washington during the financial crisis. We have spent a lot of time debating the modernization of our equity markets but our fixed income markets should not get overlooked. And while we can draw lessons from the modernization of our equity market structure, we must also be cognizant of the inherent differences between these financial products and markets.

I was very encouraged to see Chairman Clayton state in his speech before the Economic Club of New York earlier this week that he would like the Securities and Exchange Commission to be more focused on fostering the development of the our fixed income markets and ensuring investors have access to products with reliable returns.

I also applaud his proposal to create a fixed income structure advisory committee similar to the Equity Market Structure Advisory Committee formed by his predecessor. For this to be an effective committee it will, of course, need to include the right perspective of market participants, such as small- and middle-market dealers. It will also need a strong mechanism for making recommendations to the Commission so that its work won't go overlooked.

Finally, I would be remiss not to mention that, in addition to serving as vice chairman of this subcommittee, I serve as co-Chair of the Municipal Finance Caucus in Congress.

Our work is generally focused on preserving the tax-exempt status of municipal bonds, which I believe is foundational for States and local governments, especially smaller issuers, for accessing of the capital markets. Through this work, I have had the opportunity to hear the perspective of dozens of market participants, and I look forward to weighing this against the recommendations that will be made before this subcommittee today.

Thank you, again, to all of our witnesses. And I yield back.

Chairman HUIZENGA. The gentleman yields back.

And today, we have a great panel in front of us. The challenge with us doing this on a fly-out day is when everybody is trying to

escape Oz. We are trying to get back home, but that means votes are getting moved around a little bit. We have just gotten a notice that votes will be somewhere between 10:25 and 10:40, and we are going to be on the Floor for about 1 hour and 15 minutes. And so if any of the witnesses would care to shorten up their opening statement, that would be appreciated so that we can get to questions.

I will note that your written testimony is submitted for the record as well, and you will each be recognized for 5 minutes. But if you have the ability to shorten it up, that will be appreciated.

We have Mr. Matt Andresen, who is the founder and CEO of Headlands Technologies, LLC; Mr. John Shay, who is the senior vice president and global head of fixed income and commodities at Nasdaq; Mr. Alexander Sedgwick, who is the vice president and head of fixed income market structure in electronic trading with T. Rowe Price, on behalf of the Investment Company Institute; Mr. Jonah Crane, former Deputy Assistant Secretary for the Financial Stability Oversight Council (FSOC), U.S. Treasury Department; and Mr. Randy Snook, executive vice president, Securities Industry and Financial Markets Association.

So, gentlemen, we appreciate you being here.

And, with that, Mr. Andresen, you are recognized now.

**STATEMENT OF MATTHEW F. ANDRESEN, FOUNDER AND CEO,
HEADLANDS TECHNOLOGIES, LLC**

Mr. ANDRESEN. Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the subcommittee. I am Matt Andresen, the CEO of Headlands Global Markets (HGM). We welcome this opportunity to present our views on fixed income market structure and, in particular, the secondary market for municipal bonds. HGM is an SEC-registered FINRA member broker-dealer. It launched its municipal bond trading in 2014 and uses proprietary models to trade bonds electronically.

HGM is a widely recognized muni market participant, executing close to 1,000 trades a day with over 400 counterparties, ranking as a top participant on all major market platforms.

In addition to HGM, I am also CEO of its affiliate, Headlands Technologies, one of the largest global trading firms in more liquid securities.

Before founding HGM, I was co-CEO of Citadel Securities. Prior to that, I was CEO of Island, the largest electronic equities market in the U.S. at that time. Currently, I serve on the SEC's aforementioned Equity Market Structure Advisory Committee.

Last year, \$458 billion in municipal bonds were issued by local governments. Most carry tax advantages, making them an attractive vehicle for retail investors. In fact, retail holds an estimated 75 percent of municipal bonds. Retail investors also trade in the secondary market. Last year, 47 percent of secondary market trades were for 25 bonds or less, indicating active retail participation.

The secondary market is a dealer market. Investors interested in buying or selling a bond need to contact a dealer for pricing information. Public post-trade pricing data is of limited use to investors if the bond of interest has not traded recently, which is usually the

case. And due to the abundance in diversity of municipal bonds—there are approximately a million unique municipal bonds today compared to only 3,800 listed equities—investors often struggle to identify comparable bonds, making investors dependent on dealers for pricing information.

The market has seen several recent areas of improvement, however, such as the increased use of bid-wanted auctions, implementation of best execution rules, and the forthcoming markup/markdown disclosure requirements. Notwithstanding these positive developments, there are still areas in need of improvement. We share the committee's excitement about SEC Chairman Clayton's call this week for a broad review of fixed income markets.

We are going to highlight three areas ripe for improvement. First, there is the problematic practice of filtering. Filtering occurs when a broker-dealer, handling its own retail customer's order, requests a quote and starts an ATS auction but filters out responses from specified dealers. Filters are used in ways that restrict market participation, resulting in investors not receiving the best available price.

Second, there is the anticompetitive practice of a trade-through, which occurs when a retail broker-dealer initiates an auction for a customer but then ignores the results, purchasing the bonds from its customer for its own account at a lower price than the winning bid in the auction. This practice is harmful because it results in bonds sold at inferior prices than those that were available at the time of the execution.

Finally, there is Last Look, where the submitting broker-dealer observes the prices in their completed auction and then purchases the bond from the customer at a price equal to or slightly better than the winning bid, even though MSRB rule G-43 appears to prohibit such practice. This practice harms competitiveness by deterring aggressive pricing by other dealers who know the submitting dealer may step in front of their winning price.

We are hopeful that the competitiveness and transparency of these markets will continue to improve as more attention is paid to these problematic areas and as recently enacted rules, such as best execution and markup/markdown disclosure, are implemented and appropriately enforced.

We appreciate the subcommittee's attention to these important issues. Thank you.

[The prepared statement of Mr. Andresen can be found on page 32 of the appendix.]

Chairman HUIZENGA. Thank you very much.

Mr. Shay, you now are recognized.

**STATEMENT OF JOHN SHAY, SENIOR VICE PRESIDENT AND
GLOBAL HEAD OF FIXED INCOME AND COMMODITIES,
NASDAQ**

Mr. SHAY. Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the subcommittee for the opportunity to testify today on fixed income market structure. The market for U.S. Treasury securities is widely recognized to be the most liquid and consequential market in the U.S., and the U.S. Treasury bond reflects the stability of the United States and our Nation's strength.

However, the market could benefit from greater transparency, organization, and efficiency.

Nasdaq applauds SEC Chairman Clayton's call this week to form a market structure advisory committee to help the SEC study and understand the evolution of these important markets.

Nasdaq has extensive experience operating markets, and with Nasdaq fixed income, our lineage as the first electronic trading platform, we operate one of the largest and most liquid fixed income cash markets in the world.

Currently, our client profile features 112 institutional clients, including 23 primary dealers. We offer trading through our SEC-registered ATS and FINRA-regulated broker-dealer entity, utilizing an anonymous, fully electronic central limit order book using price-time priority.

Nasdaq's analysis of market structure reforms is driven by the application of core principles derived from this experience. Nasdaq believes that the market for U.S. Treasuries can be significantly improved on each of the following measures: one, the transparency benefits all market participants; two, regulation must be clear, consistent, and technologically driven; three, competition must be on a level playing field; four, equal access to trading promotes efficiency; and five, all investors are entitled to a fair deal.

These markets are evolving, and they are becoming more fragmented and segregated and subject to uneven and uncertain regulation and enforcement. Therefore, Nasdaq recommends the following basic improvements to better serve market participants and to protect investors: Transparency. TRACE reporting to FINRA was a positive step, just begun this past Monday. The further evolution toward a comprehensive centralized reporting mechanism is absolutely critical. Nasdaq does not support radical change in this area. We prefer a cautious and incremental track toward regulatory reform.

On October 15, 2014, the current market structure as we know it today experienced an unusually high level of volatility and significant price movements. It is important to state that such events are not common in the U.S. Treasury markets.

As an operator of one of the primary U.S. Treasury venues, Nasdaq could not evaluate the liquidity and/or efficacy of the entire market either in real time or on a delayed basis then or today.

October 15th prompted 5 Federal agencies to review the day's events along with trading data. The resulting findings report, published on July 13, 2015, noted that while banks and nonbanks continued to execute transactions, it was the nonbank firms that represented more than half of the traded volume that day.

Recommendation number two is to impose minimum regulatory requirements in all venues to ensure fair and orderly markets. Well-functioning markets must be transparent, fair, and orderly. This requires uniform minimum regulatory standards across all trading venues.

For example, rules similar to Regulation SCI would ensure that participants in the U.S. Treasury markets develop systems with sufficient capacity, resiliency, availability, and security to minimize the occurrence of disruptive systems issues. It is critical that trading venues do their part to keep bad actors out of the Treasury

market. NFI is operated by a FINRA-regulated broker-dealer and NSCC-registered ATS, and upholds its duties through a vetting process that includes robust know-your-customer and anti-money laundering monitoring standards under the USA PATRIOT Act.

NFI uses a third-party vendor to investigate each customer by comparing their information against 120-plus government-managed lists and websites for any negative information. NFI does not allow any access to the ATS prior to confirmation or clearance. NFI engages the same vendor to conduct continuous monitoring of customers and receives alerts when negative news is obtained.

In summary, we strongly advocate for the standardization of regulatory standards and surveillance practices across all U.S. Treasury venues. Each U.S. Treasury venue should perform similar monitoring surveillance for the activity related to that venue.

Recommendation number three is to reduce systemic risk by requiring cost-effective clearing of all transactions, be it centralized or through an interoperable model. The clearing market structure, in our view, has fallen behind the realities of automated trading. The lack of a centralized clearing solution poses material counterparty risks to the market and leads to the following: less transparency as to the size of exposure; concentration risks; clients having to post collateral at multiple venues; and a decentralized default management process that is cumbersome and prone to delays and errors.

We appreciate the opportunity to testify on these important issues. I am happy to answer your questions.

[The prepared statement of Mr. Shay can be found on page 65 of the appendix.]

Chairman HUIZENGA. Thank you very much.

Mr. Sedgwick, you are now recognized.

**STATEMENT OF ALEXANDER SEDGWICK, VICE PRESIDENT
AND HEAD OF FIXED INCOME MARKET STRUCTURE AND
ELECTRONIC TRADING, T. ROWE PRICE**

Mr. SEDGWICK. Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the subcommittee, for inviting me to testify today. My name is Alexander Sedgwick, and I am the head of fixed income market structure and electronic trading at T. Rowe Price, a global investment management firm with about \$860 billion in assets under management. I am also appearing at this hearing as a member of the Investment Company Institute, a leading global organization of regulated funds.

We greatly appreciate the subcommittee's continuing interest in ensuring the quality and integrity of the fixed income markets. These markets provide a critical source of capital for companies and governments, facilitating job creation in corporate America, financing municipal infrastructure projects, and providing a vital funding mechanism for the Federal Government.

The funds offered by T. Rowe Price and other ICI members play a significant role in this capital formation process by investing on behalf of millions of retail investors saving for their long-term financial goals, such as purchasing a home, paying for college, or funding their retirement.

Enhancing the transparency, liquidity, and overall functioning of these markets is particularly important because fixed income market dynamics affect our ability to deliver on investment mandates. And so we applaud the subcommittee for holding this hearing.

In my written statement, I outline the evolution of the U.S. Government bond market, not because I think members of this subcommittee need that history lesson, but because it illustrates how fixed income market structure evolves, and it speaks to two important points.

Fixed income securities can and indeed historically have traded in a variety of ways. Further, the development of fixed income market structure has not been linear, but it has been influenced by the changing needs of market participants, including issuers, buyers and sellers, and liquidity providers.

The result is that the fixed income market is a collection of diverse sectors, each with its own unique structure, the largest and most liquid of which is the U.S. Treasury market.

One thing I would like to note is that many of the studies focused on the Treasury market being constrained by a lack of market data. A 2015 study done by the staff of the New York Fed concluded that the liquidity is in line with historical standards. While we generally agree with this conclusion, along with the joint staff report in 2014 on the flash event, both of these reports relied on data provided by interdealer trading platforms, which highlights the need for a more comprehensive source of information in this market.

As a result, both T. Rowe Price and ICI are supportive of the regulatory reporting of Treasury trades, which began earlier this week.

Before discussing the corporate bond market, I would like to consider transparency more broadly. Buy-sized firms have a range of strong views on transparency and public dissemination of trade data. T. Rowe Price has been and continues to be broadly supportive of greater transparency in fixed income markets, although we recognize risks in this regard.

We encourage regulators to thoughtfully consider requirements to foster transparency and implement those requirements in phases with regular periods of review to minimize any unintended consequences for market participants as well as any market dislocations.

This kind of careful approach can produce a transparency regime that appropriately balances the benefits and risks of additionally transparency.

Turning now to the credit markets, there's been no shortage of commentary regarding the current state of liquidity. At T. Rowe Price, we have an optimistic long-term view. We believe that a modest increase in both yields and volatility may result in several constructive developments, including increased interests from long-term investors, similar to what we saw during the 2013 taper tantrum; buyers and sellers developing differing views of value, which is critical to creating two-way and more vibrant markets; and widening bid offer spreads, which would entice market makers to allocate capital to liquidity provision.

We are also excited about the continued development of greater electronification. While less ubiquitous than other markets, e-trading continues to grow steadily in corporate credit markets. T. Rowe Price believes that removing obstacles to further electronification will improve price discovery and facilitate best execution.

Moreover, given the recent proliferation of e-trading platforms, regulators may consider standardized reporting for Treasury—for trading volumes, which would help market participants evaluate which platform meets their trading needs.

As I said at the outset, the fixed income markets play an important role in helping millions of Americans save and invest, and enhancing the structure of these markets is critical to their success.

We greatly appreciate the subcommittee's time and their continuing interest in these issues. Thank you.

[The prepared statement of Mr. Sedgwick can be found on page 52 of the appendix.]

Chairman HUIZENGA. Thank you very much.

Mr. Crane, you are recognized for 5 minutes.

STATEMENT OF JONAH CRANE, FORMER DEPUTY ASSISTANT SECRETARY FOR THE FINANCIAL STABILITY OVERSIGHT COUNCIL (FSOC), U.S. DEPARTMENT OF THE TREASURY

Mr. CRANE. Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the subcommittee for inviting me to participate in today's hearing.

I was sitting in the Treasury Department on October 15, 2014, when somewhere around 9:30 in the morning, all of our phones started to blow up with several alerts. And we looked down and saw price alerts about the Treasury market. And after shouting several expletives, we gathered around a Bloomberg terminal and tried to figure out what was going on. And the reality is, we couldn't figure out what was going on. We couldn't figure out what was going on that morning, and it took five agencies several months to figure out what had happened that day.

So, following October 15th, an interagency group of five agencies got together and conducted what was the most comprehensive review of Treasury market structure in about 20 years and made several recommendations. Those recommendations will be reflected in my written testimony, and I will get to them very shortly.

Broadly speaking, I think what you are hearing consistently across the panel is that fixed income markets are undergoing a period of transition. It is not necessarily a recent transition. It is not necessarily limited to fixed income. And it certainly is not proceeding all at one speed.

Nonetheless, there is clearly a big transition on the way. The big theme is electronification of financial markets. This occurred in other markets, beginning with equities and futures in the 1990s, moving into foreign exchange, and at this point, it is moving into, really, all areas, even the fixed income markets.

I would just echo the chairman and the ranking member, who noted that it is important to think about the unique characteristics of the underlying market when thinking about the ways that a policy framework should shape the evolution of this trend in the different markets.

With respect to even just the Treasury market, the Treasury market itself remains pretty bifurcated between, really, a dealer market on the one hand and a client market on the other hand. When end users, like mutual funds and insurance companies, want to trade Treasuries, they still generally do so exclusively through dealers and bilateral transactions. And the interdealer market, which has opened up in the past decade to nonbank dealers like principal trading firms, you have really seen a full evolution into markets with predominant high-frequency trading now accounting for the majority of trading in the interdealer market.

So the evolution of electronification, even within the Treasury markets, is really running at two speeds. And I think the recommendations that the interagency working group made and that I will echo today really will achieve a couple of things. One, they will bring new competition into the Treasury market or facilitate the continued entry of new competitors into the Treasury market. And you could see a broader, more diverse spectrum of liquidity provision across the Treasury market, which I think would create a healthy echo system over time.

Two, it will improve resilience in the market. I think some of the recommendations that you heard Mr. Shay discuss and some of the recommendations that the interagency working group discussed would bring important stability and confidence to the market. The recommendations specifically here were registration of market participants, registration of minimum standards for trading venues. And I think those are important improvements that will help to modernize the oversight of the Treasury market.

I will end there and leave the rest of my testimony to be submitted for the record, and I look forward to answering your questions. Thank you.

[The prepared statement of Mr. Crane can be found on page 43 of the appendix.]

Chairman HUIZENGA. Thank you very much.

And Mr. Snook, you are recognized for 5 minutes.

STATEMENT OF RANDOLPH SNOOK, EXECUTIVE VICE PRESIDENT, SECURITIES INDUSTRY AND FINANCIAL MARKETS ASSOCIATION (SIFMA)

Mr. SNOOK. Chairman Huizenga, Ranking Member Maloney, and distinguished members of the subcommittee, thank you for providing me the opportunity to testify today on behalf of SIFMA and to share our views on the structure and the health of the U.S. fixed income securities markets.

The U.S. fixed income markets are truly without parallel, with nearly \$40 trillion in debt outstanding, and on average, over \$775 billion of securities traded each and every day.

As the trade association representing a broad range of financial services firms active in all aspects of the fixed income markets, SIFMA is dedicated to promoting investor opportunity, access to capital, and an efficient market system that stimulates economic growth and job creation.

Traditional bank lending is often pointed to by policymakers as the driver of economic growth, but we are here to highlight the

more significant source of financing that drives our economy: the capital markets.

Bonds finance everything from home mortgages and car loans, to highways and schools, to factories and equipment, as well as the Federal Government itself. The bond market sets the interest rates for commercial and consumer lending and provides a safe and predictable investment for millions of Americans.

The cumulative impact of post-crisis reforms must be studied and reconsidered to ensure our capital markets are providing funding in the most efficient way possible.

This is particularly important since product credit extended to households and nonfinancial businesses has grown at a slower pace than in all recoveries in the past 60 years. SIFMA supports many of the post-crisis capital reform efforts and believes they have enhanced the overall resiliency of our capital market system. However, now is the time to review how those rules work together with a particular emphasis in determining where they may be impeding liquidity by targeting the same risk in multiple ways.

A review should include the new liquidity and leverage requirements but also look at the effect of the interactions with the CCAR rules, Basel III capital rules, and single counterparty credit limits.

We firmly believe that this sort of clear review of the potential costs of the current and additional requirements, which could limit the capital available for lending, should be undertaken. We are pleased to see that policymakers have begun to move in that direction.

While trying to understand the state of liquidity, it is certainly helpful to understand the end users and investor points of view. In a 2014 and 2015 survey of corporate bond investors, Greenwich Associates asked about the ease of trading corporate bonds by size. In each year of the survey, 75 percent of the investors found it difficult or extremely difficult to execute or trade in block sizes of corporate bonds measured as \$15 million and larger in size.

Regulation does, indeed, impact liquidity. For example, the Volcker Rule's limits on trading by banks in some cases constrain dealers' ability to take on trading for dispositions and build inventory necessary for market making. Capital and leverage rules also limit dealers' ability to finance positions held in inventory and can clearly limit their ability to commit to customer trades.

Although just one of the markets discussed here this morning, the importance of the Treasury market or system to our economy cannot be overstated. This unique, resilient, and robust market serves multiple roles, including as the transmission mechanism for monetary policy, and as a safe haven investment, particularly during times of financial stress, and, most importantly, as a source of stable and efficient funding for the Federal Government.

Given its importance, continued study of any potential changes is required to ensure the U.S. Treasury securities market remains the preeminent benchmark in the world. Any changes to regulation should be carefully calibrated to support both the resiliency and the role of the Treasury market and recognize the unique auction process that has allowed the Treasury to finance the government at extremely low cost to taxpayers.

We support the government's program to collect secondary market transaction data, which began last week. Additional changes, however, including the public dissemination of that data, need further careful study, including a clear articulation of any potential benefits to the market to ensure no harm.

In conclusion, SIFMA believes that policymakers have the ability to enhance economic activity through tailored recalibration of rules and regulations affecting our capital markets. This recalibration could help jump-start the economy without sacrificing financial stability. We very much appreciate the opportunity to present our views here today. We look forward to working with policymakers to help ensure that our capital markets continue to perform their vital functions and operate safely and efficiently to move America forward.

I look forward to answering your questions. Thank you.

[The prepared statement of Mr. Snook can be found on page 82 of the appendix.]

Chairman HUIZENGA. Thank you.

And I thank each of you for your testimony.

At this time, I will recognize myself for 5 minutes. And I am going to try to move rapidly through this and make sure we have time for the other Members here.

Given the testimony today, I have heard a lot about transparency and fixed income markets. Mr. Shay, and Mr. Sedgwick, especially, you note in your testimony there is room for improvement in transparency and reporting in fixed income transactions, such as FINRA's TRACE, Trade Reporting and Compliance Engine, reporting regime. Can you please explain how this is helpful to both regulators and the market participants?

Mr. SHAY. Sure. I am happy to start.

Without market data, and as we saw back in October of 2014 and as I think you have heard from testimony from members today, it took over a year for the regulators and the five different government agencies to come together with a proper understanding of what happened. And in my oral testimony today, I just mentioned as well that if there were to be another similar flash rally or "12 minutes of fury," as we called it, it would be very difficult for us as a venue to be able to diagnose what actually happened. It would be nearly impossible for the regulators. It would have to be another multi-month process.

But during the crisis, I was working at a professional trading firm named Virtu Financial. And we were in the enviable position of having market data inputs from the various futures venues, from the cash venues, from the various direct venues that we were using to trade this product. And it was very easy for us to recreate what had happened. In fact, we had spent some time with both the Federal Reserve and Mr. Crane at Treasury reviewing our market data, but, of course, it had to be confirmed independently. And that took an enormous amount of time.

And, certainly, in that period of time, Mr. Chairman, I think it would have been very helpful if the regulators—Treasury and the Fed—all had that data at their fingertips to be able to diagnose the problem.

Chairman HUIZENGA. Mr. Sedgwick, would you care to jump in on that?

Mr. SEDGWICK. Thank you for the question, Mr. Chairman.

I would say there are three main areas where transparency is important to us. The first is, as we are trying to deliver on our investment mandates, it allows us to identify relative value opportunities within the market. So the ability to look at where individual bonds have traded and the relative value from an investment perspective.

I think, additionally, liquidity has been a topic that we have all talked about in our opening statements. I am sure it is something we will talk about further today, but it is really helpful in helping us identify where there are pockets of liquidity in this market.

Of the 20,000 or so investment grade bonds, there may only be 6,000 traded on a given day. It is important for us to understand which ones those are so we can frame up the market from that perspective.

I think the final piece that I would point to in many respects is probably the most important, and that is we leverage TRACE data for trade cost analysis. That allows us to give transparency back to not only our portfolio managers internally but also our retail and institutional clients.

Chairman HUIZENGA. So, again, I am hearing a lot about the transparency, and I know, Mr. Andresen, you talked a little bit about filters and Last Look and some other things. And, Mr. Shay, you had talked about—I think points number three and four were equal access and fair trades.

Some have called for an electronic trading platform for fixed income lead in order to increase this transparency. Is that the right direction to go?

Mr. ANDRESEN. I think, without question, it is. Americans insist on transparency in almost all of their economic transactions. If you own a house, and you are able to find out if anyone else in your neighborhood sold their house, what the price was. It is a matter of public record. Imagine trying to put your house up for sale and having no price discovery, no idea what prices may have been in the last 2 years, the last 3 years.

Chairman HUIZENGA. So is that a vital piece, getting this electronic—

Mr. ANDRESEN. I think, without question. In municipal bonds, we have the EMMA system, with which we can see every trade that happens as reported. It is reported in near real-time and is visible for all investors. This is a critical tool for investors to understand where the market is pricing risk.

But the challenge for municipal bonds—and I know I scared you. You thought this was my testimony.

Chairman HUIZENGA. Yes. I noticed you had a little notebook.

Mr. ANDRESEN. This is five columns, printed on both sides, a list of individual municipal bonds. It lists 700,000 individual securities. Most of them do not trade in a given day, a given week, or a given month. So just having that bit of pricing—

Chairman HUIZENGA. You did mention that is only “A” through “N.”

Mr. ANDRESEN. Yes, that is “A” through “N.” My colleague is not fit enough to carry the whole thing.

Chairman HUIZENGA. I think what we are going to need to find here, though, is consensus. And is there industry consensus on this that this is a direction to go? That is certainly something I am looking for in this.

My time is up, but I suspect that we will have some fairly extensive written follow-up questions as well for everybody, and I look forward to that.

So, with that, I recognize the ranking member, Mrs. Maloney, for 5 minutes.

Mrs. MALONEY. Thank you, Mr. Chairman.

Mr. Crane, you mentioned in your testimony that you were there for the very famous Treasury flash crash in 2014. And one of the recommendations coming out of the staff report was that firms should be required to report their transactions in Treasuries to regulators on a daily basis. And as I understand it, it is being implemented even this Monday by the SEC and FINRA to have that take place.

One of the other debates following that action was whether Treasury transactions should be reported publicly as well. And some have said that this would be unfair; high-speed traders would take advantage of it. But others have thought that it would increase market quality and stability and bring more investors in.

So what are your thoughts on this? Should transactions in Treasuries be reported publicly or just to regulators?

Mr. CRANE. Thank you for the question. I don’t want to—I don’t think it should be underestimated how important the launch of official sector reporting on TRACE was this week. That is an important step, and I commend FINRA and the SEC for following through on that initiative.

As Mr. Shay pointed out, it will be really helpful in future episodes of volatility to try and diagnose what had happened.

You asked about making that information more broadly available to the public, and I do think that is an important next step. Public transparency can improve liquidity markets. It can improve participation, create a more level playing field. And I think history shows that when you brought transparency to new markets, especially when it has been done in a thoughtful way, that it can improve the overall health of the market.

I do think it is important for it to be done in a thoughtful way. It is important to think through the unique characteristics of Treasuries and the role that they play in the global economy, to have large reserve managers around the world and large institutional investors like insurance companies, who hold large amounts of Treasury securities. And if they need to trade in large blocks, putting that trade out there for the world to see may be a risky proposition.

So I think it is important to think through how to accommodate the important unique aspects of Treasuries, but I think that can be done with thoughtful design. When FINRA originally launched TRACE for corporate bonds and then for agency—mortgage-backed securities, they took a similar thoughtful approach. They implemented delays in reporting. They implemented size thresholds so

that block trades were masked, for example. I think it is important to be thoughtful about it, but the concerns that have been raised about public transparency in Treasury markets can be addressed through thoughtful design.

Mrs. MALONEY. Okay.

What are your thoughts on it, Mr. Sedgwick and Mr. Shay?

Mr. SEDGWICK. As I mentioned in my opening statement, T. Rowe Price has been broadly supportive of transparency across the markets.

While we are aware of some of the risks that I think Jonah outlined, I think, in general, we look at the way TRACE has been administered as they expand to new asset classes and the extent to which disclosures have been adjusted accordingly, and so I think, in this particular case, presuming the same approach is taken, we would find value in that.

I think one thing to point out is, in some respects, when you are looking at the credit markets, you are dealing with investment views being articulated through a trade. In Treasuries, in some respects, you are also dealing with collateral trades; you are dealing with a variety of other reasons you would trade those securities. So, in some respects, that information may be less sensitive.

Mrs. MALONEY. Mr. Shay?

Mr. SHAY. I always find it interesting when I hear public data being made available to the professional trading groups as being a negative. As we have seen, those particular firms enhance other markets that we at Nasdaq are very active in, most notably the equity market, the equity option market, the listed futures market. But it does strike at the heart of real clearing.

The large banks in the last 8 years have become extremely good at managing their technology as well as world class at managing risk. They are enormously or, you could almost argue, overcapitalized at this moment. And they are wonderful in that they have large balance sheets. They have a huge list of clients, and they manage the risks for them.

So the idea would be making data public to everyone in a way doesn't level the playing field. It is just a normal response. As Mr. Andresen noted, you are not going to sell your house without market data. You are not going to buy your car from the dealer that you always go to when you could buy it from a dealer across town for \$1,000 or \$2,000 less.

Mrs. MALONEY. Thank you.

And I would like—Mr. Crane, there has been a lot of talk on this committee about how the liquidity in the corporate bond market has declined in recent years. And do you think it has declined enough that major regulatory changes are necessary?

Mr. CRANE. It is a good question. I think, first, it is important to remember that it has declined from a pre-crisis period that is probably not the best benchmark to use. I think the pre-crisis period was an anomaly in terms of extremely high liquidity, and it was probably driven by a lot of leverage and turned out to not be all that resilient, as we discovered. So I think I would hesitate to draw any firm conclusions about how—just how far—

Mrs. MALONEY. Thank you.

My time has expired. Thank you.

Chairman HUIZENGA. The gentlelady's time has expired.

Unfortunately, they have announced they are moving up votes. We don't know when that will be, but my intent is to try to get through as many people as we can, and then we will evaluate if our panel is available to then take that break, vote, and come back; if you are able to stay.

So, with that, I recognize the vice chairman of the subcommittee, Mr. Hultgren, for 5 minutes.

Mr. HULTGREN. Thank you so much, Mr. Chairman.

And thank you all for being here. We appreciate your testimony.

Mr. Andresen, it is great to see you. Thank you for coming up from Illinois to testify today.

We have seen our equity markets evolve more quickly than our fixed income markets, at least in terms of the number of trades being executed electronically.

As someone who played an integral role in the development of our modern equity markets, and who now serves on the SEC's Equity Market Structure Advisory Committee, what takeaways do you think we can apply from this evolution in our equity markets to our fixed income markets, if any? And do you believe our fixed income markets will continue to develop due to market forces, or what other role should government have, if any?

Mr. ANDRESEN. I think government can play an important role here. Fixed income, as you see from my list of securities here, will never look like the market for Google or Amazon or Facebook. There is a very small number of equity securities. A lot of interest, as Ranking Member Maloney pointed out, is concentrated on one product, whereas in fixed income, even if you have a multitude of issuers, all sometimes with hundreds of different securities, you are never going to have streaming bids and offers driven by natural flow. Most times, things will only trade by appointment. But that doesn't mean that electronic trading can't play an important role, and the government can't play an important role, in facilitating this.

Already today, in the muni markets, there are about 40,000 trades a day, and about 8,000 of those actually take place on alternative trading systems. Now, the primary method of trading on this doesn't look like the New York Stock Exchange or like Nasdaq. It looks like an auction. It takes about 4 hours. An auction is initiated. Participants who come in can bid on this, and it is a competitive auction that yields a very good price.

In fact, today, there is an average of over seven bidders per auction. If you had seven bidders on your house, you would probably get a good price. So this is a very robust process that is working.

The challenge we have, and where I think government is taking the lead, is to try to bring in new rules to encourage the use of this facility and to encourage the proper adherence with best practices for how the rules work within those auctions.

Routinely, we see 15 to 20 bidders in these auctions. And I think, with the new rules coming into effect, if you had the majority of orders in these auctions, you would have a very efficient result, but we are not there yet.

Mr. HULTGREN. It sounds like from your answer, you would say that these auctions are competitive for municipal bonds?

Mr. ANDRESEN. The auctions are—we were very surprised when we got in this business. It took us years to build the modeling to be able to make these prices. And we anticipated that, because of our breadth, we would sometimes go into these auctions and be virtually alone. And we were very surprised to find that they are actually quite competitive.

Mr. HULTGREN. It is helpful.

Mr. Snook, do you have any response to that? Do you agree? Do you disagree?

Mr. SNOOK. I think the main point we would want to emphasize around electronic trading—and electronic trading has been growing and developing for close to 20 years now—is that there have been a large number of new entrants coming into the market. So we are in favor of pro-competitive forces, encouraging the innovation and experimentation that is happening.

In each of the markets, we see different degrees of adoption and use of electronic trading. That is a good thing. But we think it is important that it can and should develop as organically as possible in a pro-competitive way without really deciding externally what the correct market structure should be. Let's let entrants come in, innovate, compete, find the best ways to use and leverage the technology and leverage the data, and I think that is what we see. We see 20 percent of corporate bonds traded electronically now. There are estimates that agency MBS close to three-quarters. Parts of the government market, particularly in the on-the-run sector, are nearly at 100 percent. So we are in favor of encouraging more electronic trading but not imposing that externally.

Mr. HULTGREN. Let me ask one last question here to Mr. Shay.

You mentioned in your testimony that Nasdaq is not advocating for something similar to Reg NMS being applied to U.S. Treasuries. What steps can policymakers take to acknowledge the imperfection of Reg NMS and to make sure any potential new rules are appropriately tailored for Treasuries? We just have a few seconds.

Mr. SHAY. I think it comes down to clearing. And right now, you have a market that some securities, with FICC clearing members clears at FICC, part of the DTTC. Some clear at Fedwire. You have this global risk-free rate that exists as the benchmark of the world, and, yet, it doesn't perfectly clear. When you do clear it at FICC, it is very expensive. They are cumbersome, anachronistic, idiosyncratic rules that no longer make real-day modern market sense.

Mr. HULTGREN. Thank you all.

I yield back.

Chairman HUIZENGA. The gentleman's time has expired.

The Chair recognizes the gentleman from Connecticut, Mr. Himes, for 5 minutes.

Mr. HIMES. Thank you, Chairman Huizenga. I would like to echo the ranking member's gratitude for the substantive and generally nonpartisan approach of these hearings. I very much appreciate that. And I thank the witnesses as well.

Gentlemen, I want to ask you a question about the Volcker Rule and its effect on liquidity. We went through a big exercise in the passage of something called the CHOICE Act, which is really kind of a rollback of many Dodd-Frank regulations. The premise was that Dodd-Frank regulations were harming capital markets. And if

you look at capital markets, actually, there is not much data to support that, whether it is venture capital, private equity, corporate bond issuance, secondary markets, IPOs, you name it. Those markets are pretty robust and growing.

That is not necessarily true in smaller business lending.

And, Mr. Chairman, I would love to see us take a look at the issues affecting smaller business lending. It also would appear that there is some data and studies supporting the notion that the Volcker Rule, which I strongly support—I just don't believe that FDIC-supported institutions should be making proprietary bets. There is a Federal Reserve study and other suggestions out there that in moments of stress, we may have a liquidity issue in the corporate bond market.

So I guess I am going to point this question first to Mr. Crane, as a non-private-sector participant, but then somebody else from the private sector: Are you concerned that the Volcker Rule is, in fact, constraining liquidity in a way we need to be conscious of? And then, if you agree with me that we probably shouldn't do away with the Volcker Rule, meaning we don't want FDIC-insured institutions taking proprietary bets, is there a modification or change to the Volcker Rule that might allow for, if, in fact, there is a decline in liquidity and stress corporate bond markets, that would sort of fix that problem if it exists?

Mr. CRANE. Thanks for the question.

As discussed in a little more detail in my written testimony, I don't think there is a lot of evidence—and you hinted at this as well—that there has been a broad-based deterioration in liquidity. So it is a little bit—I am not sure I fully agree with sort of the premise of that assertion.

But there was one study you alluded to done by the Federal Reserve staff. I think it is notable in that respect that the periods of stress that study looked at were downgrades of the individual securities. So, ordinarily, when I think about liquidity in a period of stress, I think about market stress and marketwide stress, not an individual security experiencing a downgrade in an otherwise normal market.

So I think it is a bit of apples and oranges. That study alone, I think, read in conjunction with the rest of the evidence on liquidity, makes it difficult to conclude that there has been a broad effect on liquidity.

That said, I heard Chair Yellen's testimony, I think it was yesterday, on the Senate side, where she suggested trying to look at some of the complexity involved in Volcker Rule implementation, and I think that it is appropriate for the regulators to do so.

Mr. HIMES. I don't know. Is there maybe, T. Rowe, a private sector, take on that question?

Mr. SNOOK. I would just add our perspective, which is we do think the Volcker Rule, among other rules, is impacting liquidity. I think it is important to acknowledge—

Mr. HIMES. Let me stop you, Mr. Snook. We talked about the Federal Reserve study. Can you point us to other studies that back that assertion?

Mr. SNOOK. I think the Federal Reserve study is a good way to isolate what we would consider a stress environment. There are

different ways to do it, but I think that was a really thoughtful way of doing it.

When we look at the volume of secondary market trading in the marketplace versus the total outstanding, it hasn't kept pace with the growth of the market. So we acknowledge that the primary markets are very strong, but there is a virtuous circle that exists between primary and secondary markets, and people will pay the better prices. They will pay a liquidity premium when they have confidence in that very strong and liquid secondary market. They will pay a better price in the primary market. So that is why liquidity is important.

We are in a relatively benign environment where we have low rates. We have low volatility. We have a lot of stability. We are concerned that, if we had more volatility in a rising rate environment, that would put pressure on market making.

And to your point earlier on the small cap companies, there is evidence that, despite the growth in the markets, it has been principally larger companies issuing larger bonds, and there is evidence that the number of smaller companies issuing, measured by size of balance sheet assets, there has actually been a decline, despite the growth of the marketplace.

Mr. HIMES. No, I take that point. Again, I looked pretty hard at all of the capital markets.

Again, I will direct this to the chairman. I think there would be bipartisan support for a hard look at capital availability for smaller businesses, but I am out of time.

So I appreciate the perspective, and I yield back.

Mr. SNOOK. Thank you.

Chairman HUIZENGA. The gentleman's time has expired.

The Chair recognizes the gentleman from Arkansas, Mr. Hill, for 5 minutes.

Mr. HILL. I thank the chairman.

I appreciate the opportunity to talk about fixed income structure. Listening to this is always inspirational to me to see this much talent in a panel. We are all benefited by that.

I have to tell you, though, that when I started in my financial career, the top technological innovation, Mr. Andresen, was muni fax coming across the thermal paper in our offices in the 1970s. So it has been neat to see the evolution of the market from that moment where we did official circular files and kept copious notes to Bloomberg's advances and now your trading platform you talked about today.

You would agree, though, that there are houses that there are no bids for. Have you ever seen a—you are a fencer. So is there an electronic scoring in fencing?

Mr. ANDRESEN. Yes, sir, there is.

Mr. HILL. And how does that compare to human scoring? Pretty good?

Mr. ANDRESEN. As an American, when I used to compete in Europe, we always felt like we got some inventive interpretations from the European referees about how to interpret an electronic score box.

Mr. HILL. Yes. So, there is no more over-the-counter, more complex market than the muni market, and you illustrated that.

Mr. ANDRESEN. I would agree with that.

Mr. HILL. And I listened to your opening comments, and I took them sort of as I want to lead us to the future technologically, but I took your comments as a bit of a pejorative maybe towards dealers across the country that are in the muni market. You probably didn't intend that. Maybe you did. It came across pretty negatively.

And I think there are a lot of people out there trying to fill demand in the municipal market, which is very challenging, whether you are at T. Rowe trying to fill out a ladder portfolio or individual market-making, which doesn't make me not interested in EMMA's success or your trading platform. I am for it.

I just want to recognize that, with over a million issues, some a million bucks, some that had one buyer, and the difficulty and the fact that most of them are nonrated, and even Bloomberg's database is feeble, that it is not fair to say, in my view, that this is just going to be imminently electronic, made electronic, and easily auctioned across the country.

So I just want to, after 40 years of experience in the market, get that off my chest. I feel better now, Mr. Chairman. Thank you so much.

Chairman HUIZENGA. We are here for your therapy.

Mr. HILL. Thank you. And in Congress, we need it. We only have one psychiatrist in Congress, Tim Murphy from Pennsylvania. We need dozens more. So thank you for that.

Mr. Crane, I want to talk for a minute about the Treasury market. In your view of—you talked about the electronics there. Tell me a little bit about the changes in the market you saw at Treasury. We had 40 dealers when I worked at Treasury. We have 20 or so now. That is maybe not even relevant anymore vis-a-vis how the market has changed.

Talk to me about access to the market, price discovery in the market. And just give me some more of your views on that.

Mr. CRANE. Sure. Thank you for the question.

As you note, the number of primary dealers has declined over the last several decades. I think we are 23.

At this point, I think in terms of secondary market trading, it is somewhat less relevant. The inter-dealer market was opened up to nonbank dealers beginning in the early or mid-2000s. Firms like Citadel, eventually Virtu, are competing actively in that market.

And it has really become—there are sort of two primary platforms, one operated by Nasdaq and the other is BrokerTec, and they operate a lot like our stock markets do. There are central limit order books, anonymous trading, high-speed electronic trading.

And then there is a very different market in the customer market, for a lot of good reasons. Customers whom, as I indicated before, may not want to expose their trade to everybody, may want to transact in a different market. But the dealer-to-client market is very different. Parts of it are electronified, but in many ways it is just sort of doing electronically what used to be done by the phone.

The latest data I saw indicated that a majority of trading in the dealer-to-client space was still actually done over the phone. If you think about the underlying nature of Treasury securities, very liq-

uid, very standardized, et cetera. So it is a little surprising to see that much trading by phone.

But it is important to recognize that not all Treasuries come in the same form. Even on-the-run, the most recently issued Treasuries, trade a lot more.

And then there tends to be a process—and I think this is true across fixed income, although the other panelists should validate this—that in fixed income securities get issued, and they trade for a little, and then they tend to sort of find a home with a buyer. And then they trade less often.

So you do tend to have these very different liquidity characteristics in more recently issued securities than more aged securities.

Mr. HILL. Thank you, Mr. Crane.

Thank you, Mr. Chairman.

Chairman HUIZENGA. The gentlemen's time has expired.

In the absence of Members on the other side, we will continue on our side of the aisle.

With that, the gentleman from West Virginia, Mr. Mooney, has 5 minutes.

Mr. MOONEY. Thank you, Mr. Chairman.

I am very intrigued with the transparency comments that were made. There is a famous statement by Louis Brandeis in 1913, that sunlight is said to be the best of disinfectants.

So, Mr. Sedgwick, you talked a lot about transparency in your comments. Are you suggesting that transparency can do a better job than more regulations would?

Mr. SEDGWICK. I think in many respects, when you look at transparency, what that really does is help remove some of the obstacles to things, for example, like greater electronification. We tend to see more electronic markets in more transparent markets. So when I think about transparency, that is an opportunity to facilitate greater electronification.

In addition, I think that transparency also, as I mentioned earlier, helps us manage our trading costs and be able to provide additional transparency back to retail investors. So I think that is also helpful.

I think ultimately, when we look at transparency, it is really about giving the market an opportunity to find equilibrium around things like the optimal state of liquidity.

Mr. MOONEY. This question is probably more directed to Mr. Shay as a follow up. And we have here an Ethics Committee where there are three Republicans, and three Democrats, and we peer review ourselves to keep ourselves straightforward and review it that way. My wife is a doctor. They have other doctors who peer review what doctors do to decide if they have done something they shouldn't have done rather than a bunch of bureaucrats.

So, Mr. Shay, you mentioned a lot about surveillance and bad actors, keeping the bad actors out. I was wondering, can you do that internally with some peer reviews of people in the industry rather than a government program of some kind?

Mr. SHAY. We actually do do that. So if you are going to take on a new client, whether it be a PTG or a firm that meets our standards for joining our platform, you are going to subject them to a clearing sort of pathway. So they cannot gain access to our plat-

form unless they have enough capital to satisfy the minimum clearing requirements, because we, as an ATS in the U.S. Treasury space, are requiring firms to eventually get their trades cleared through the FICC, which is part of the DTCC.

So is this whole shining of the light on one's balance sheet, availability of capital, actual firm capital, is all measured and predetermined before trade one is even remotely put on.

Mr. MOONEY. Thank you.

Mr. Chairman, I know time is tight, and there are a lot of people in the queue, so I will go ahead and yield back the balance of my time.

Chairman HUIZENGA. The gentleman is deeply appreciated by that, I am sure, especially by the next gentleman.

With that, we have Mr. Budd, who is up for 5 minutes or less.

Mr. BUDD. Thank you, Mr. Chairman.

And I thank each of you for being here today.

So to Mr. Sedgwick, post-Dodd-Frank and Basel III, we have heard from market participants that regulations that micromanage trading behavior are impacting liquidity, specifically a decrease in the lack of sustainable liquidity in the U.S. swaps market, corporate bond markets, and the U.S. Treasury market. Do you agree with that statement?

Mr. SEDGWICK. I would say that the Volcker Rule, Basel III, and the Dodd-Frank Act were all factors in effectively disincentivizing dealers to commit capital to secondary trading. So what we have seen when we actually transact in the market is that whereas we used to transact with a principal commitment to do large trades, now much of the trading is taking place in a more agency fashion.

What that means is that we are largely dependent on there being the opposite side of the trade or counter interest in the market for the trades we would like to do.

The impact to us has been, in a lot of respects, to take large orders, split them into smaller sizes, potentially fragment our work flow, and source liquidity from different areas.

So I think in some respects—I am sure you have heard a lot of conversation in the industry about low liquidity—the real conversation is actually about the changing way in which liquidity is being accessed and how it is being delivered to us. That has been the most fundamental change since the crisis.

Mr. BUDD. So in the simple yes/no, it would be a “yes?”

Mr. SEDGWICK. Yes.

Mr. BUDD. We know that the U.S. fixed income market is massive at roughly \$40 trillion and that the largest subcategory of that is U.S. Treasury debt. So with the national debt approaching \$20 trillion, do you think that U.S. debt is not subject to market forces?

Mr. SEDGWICK. I would say it is, yes.

Mr. BUDD. Okay.

In the interest of time, I am going to let some of my colleagues go, as well. I have many more questions. If we come back after votes, perhaps I will ask some more, Mr. Chairman.

Chairman HUIZENGA. I appreciate that. And we have a number of gentlemen and scholars, apparently, on the committee.

So with that, I recognize the gentleman from Indiana, Mr. Hollingsworth, for up to 5 minutes.

Mr. HOLLINGSWORTH. Good morning. Thanks to everybody for being here.

I wanted to touch on, frankly, what Mr. Budd had started, which is, again, talking about liquidity. And I think, as the gentleman across the aisle had said, perhaps some of the indicators show that there is ample liquidity in certain markets today, but I find that it is not in good times that you find out you have enough liquidity. It is really in moments of acute stress when you determine whether or not you have enough liquidity in the market.

And I was struck by the recent Treasury report that came out and some of its simplification and repurposing of the Volcker Rule, if not eliminating it, and I was curious if you all had a view on whether that went far enough. Some of the proposals that are out there in the Treasury report include eliminating the 60-day rebuttal presumption, changing some of the purpose tests around prop trading, and then, in addition to that, giving some more flexibility in determining what reasonable market-making is for banks.

And I am just curious if you all had a view of whether that went far enough in reforming the Volcker Rule or whether we needed to go even further, in fact eliminating the Volcker Rule, in order to enhance liquidity.

I would point out to my gentlemen across the aisle that inventory is down 92 percent, according to Bank of America and SIFMA, but it is down a further 55 percent from 2013. So this is not just from a peak that is anomalous, but instead from even normal periods. Going back to 2001, we see that inventory is down dramatically, and I worry about liquidity.

Mr. SHAY. And our large banks are very well-capitalized, as I have already mentioned. They have huge client distribution networks. They were viewed in the world as these wonderful risk transfer agents.

So in that new ecosystem that the banks have created for themselves post-crisis, I think it would be very beneficial to have the chains taken off and to allow the banks to again perform their duties as risk transfer agents, certainly in the yield or coupon security businesses that we are trading in.

Mr. HOLLINGSWORTH. Any comments from any others? Fair enough.

The other report that I wanted to talk about was that in the Federal Reserve's July 7th Monetary Policy Report—we recently had Chair Yellen in—they describe, and I am just going to read this statement, and I am kind of interested in your views on it, “A series of changes, including regulatory reform, since the global financial crisis have likely altered financial institutions’ incentives to provide liquidity, raising concerns about decreased liquidity in these markets, especially during periods of market stress,” something I also believe in.

But I am curious if that is something that everybody here believes in. And then are there other regulations, outside of Volcker, that have contributed significantly to the decline in liquidity?

Mr. SNOOK. Sure. So maybe just to round up the point on Volcker, I think, and our members believe, that the Treasury report provided a lot of good suggestions. We believe that it may be best to repeal it. If that is not the approach, a more clear and fo-

cused definition of what is proprietary trading as opposed to the negative presumption, the 60-day test, and the activities-based exemptions could be a better way to go. So we do think that is a rule that is impacting liquidity but that the implementing regulations would be improved.

Our members who have market-making functions are doing so in a very cautious and deliberate way to make sure they are within the guardrails of what the rule and what the compliance regimes dictate. And things like reasonably expected near-term demand (RENTD), are very difficult to use dynamically because they are backward-looking processes.

It often can be the case that, as you look forward, the customer demand and the customer needs are quite varied. It could be a large portfolio rebalancing, or that an asset manager wants to shift from fixed income to equities. It might be something where a large corporation wants to enter into an interest rate hedging program to finance long-term debt and thus it may be foreseen that down the road and need to use interest rate swaps to do so.

Mr. HOLLINGSWORTH. I think that is right. And I think one of the things I hear from businesses all the way across the district, not just in the financial space but all of them, is the gray area around regulators' ability to interpret rules is causing them to move further and further away from what they think the actual rule says, because they just don't know how they are going to be interpreted, and there is so much gray around that. So we get further and further back, thus hampering their ability to make markets or, in other businesses' case, produce the goods that they once thought that they could. And so I appreciate that.

Mr. SNOOK. Thank you.

Mr. HOLLINGSWORTH. With that, I yield back, Mr. Chairman.

Chairman HUIZENGA. We have been on a roll. And I appreciate the gentleman yielding back.

I recognize Mr. Messer for up to 5 minutes.

I will make a quick note. They are debating the final amendment. And at this point, we have three Members in the queue. Hopefully, we will be able to get through that before we need to break for our vote.

So with that, Mr. Messer.

Mr. MESSER. Mr. Chairman, I will work to not use my entire 5 minutes. I heard your message and I will work to do that.

Chairman HUIZENGA. Ten points to Gryffindor.

Mr. MESSER. It's great to follow my colleague from Indiana.

Mr. Snook, I would like to ask you what I think is a fairly narrow, but at least to me important, question.

As you know, current regulations do not permit banks to hold investment-grade municipal bonds, American investment-grade municipal bonds, as high quality liquid assets for the purposes of their liquidity coverage ratio (LCR). It creates this sort of odd circumstance under Basel where certain German municipal bonds can be counted as highly qualified liquid assets where American municipal bonds, some of the best investments in the world, safest places to put dollars, are not.

In a final rule released by the Fed in April of 2016, I was encouraged to see that the Fed conceded that investment-grade municipal

bonds are appropriate for banks to hold under the LCR. And the Treasury Department issued a report last month that recommended these bonds be reclassified as 2B HQLAs. However, until the FDIC and the OCC act, banks will not be able to count these bonds as part of the LCR.

So what impact do you think reclassifying investment-grade municipal bonds would have for cities and towns that issue bonds across the country?

Mr. SNOOK. First, thank you for that question. I think, obviously, the municipal bond market is an incredibly important part of our fixed income markets. \$400 billion in each year, year in and out, plus or minus, is issued in that marketplace, and it is obviously a critical part of financing our infrastructure.

We talked earlier about the municipal market being less liquid and anything that further constrains or curtails the buyer base is potentially harmful. And so it is important that munis are traded as high quality liquid assets for purposes of the liquidity coverage ratio, because depository institutions, banks, hold over \$500 billion in municipal securities.

So for that to be constrained or curtailed, I think would be a negative. We want to encourage the use of munis. And if they are investment grade, high quality, readily marketable, that makes sense to us.

Thank you.

Mr. MESSER. So on the margins, them not being counted drives up the cost on the margins?

Mr. SNOOK. On the margin, it will drive up the cost and put an additional burden on municipalities and taxpayers there.

Mr. MESSER. And so the reverse, if they are counted, right? Lowers the cost, less burden.

So do you think this type of action would ultimately save taxpayer money while ensuring the integrity? You just said that, of course you do believe that. So I guess my next question would be, do you think legislation is necessary to ensure that investment grade munis are reclassified as HQLA?

Mr. SNOOK. It may be the case. We are hopeful that the banking regulators collectively work together to get there, but it may be the case that we, in fact, need legislation.

Mr. MESSER. Yes. In respect to the chairman's time, I guess I will yield back my time. We are working on legislation in a bipartisan way to do that, trying to create a floor at that 2B level that would then allow them to be, maybe, lifted even beyond that.

These are safe assets. They are rarely traded because, frankly, people take their money and keep it there. But in times of financial crisis, they are a place where dollars with flock. And so in that way I think I think they are very liquid.

Mr. SNOOK. And we are very much appreciative of the leadership and the work you are doing there.

Thank you.

Mr. MESSER. Thanks.

Chairman HUIZENGA. I appreciate the gentleman taking a hint from the jumbotron behind there.

And we have two. Hopefully, if we can get through that, that would be a great cap to this.

I now recognize Mr. Emmer from Minnesota.

Mr. EMMER. Thank you, Mr. Chairman.

And thanks to the panel.

I don't have the background of some of these people, like my colleague from Arkansas, the 40 years that he has. I just watch what happens and look at this market.

And whether it is the equity markets or the fixed income market, available and accessible capital is what drives our economy. In many ways, in my opinion, these markets are the true definition of American freedom, the ability of people from all walks of life to access capital to start a new business, to make an important purchase, to pursue their American dream. That is what these markets are all about. And it is interesting, because we are talking about transparency and liquidity, the evolution of the fixed income market, the marketplace itself.

And one of my colleagues was talking earlier to you about his concern with small-cap companies, and I would add mid-size or mid-cap companies. Because it seems what I have watched in the last 8, 10 years, maybe longer, but certainly as I have seen it, more focused in the recent past, we have built policies or we have instituted policies in this country that have allowed the larger to get even larger. They have been one-sided. I heard Mr. Shay talk about the large banks and we should take the chains off and return them to their risk-transfer function.

And it seems to me, and my colleague from Indiana, Mr. Hollingsworth, actually cited the July 7, 2017, Monetary Policy Report from the Fed, and he read you a quote, I hope you remember it, but I would like to know if you agree with that, and specifically the Fed's assessment of the state of the liquidity in the corporate bond market.

And then I would like you to talk, and it can be anybody on the panel, I want to know what regulations have contributed to the decline in liquidity and what are the potential solutions? And, again, with a focus towards how do we get the lower end, the small-cap companies, the mid-size companies, so everybody has access to capital.

Why don't you go ahead, Mr. Andresen, and start?

Mr. ANDRESEN. Thank you.

So I serve on the Equity Market Structure Advisory Committee, and this was a focus from the beginning of that committee's work, was we all agree that the structure did a fantastic job for helping transactions be effectuated in SPDRs, in Google and Apple and these huge companies.

But clearly, in the smaller cap names, that is a dealer-driven market. We are a dealer. Our purpose in the muni markets is to transfer that risk. We hold each position, on average, about a month.

And that is the same type of structure you see in small cap companies. You need some intermediary to step up and warehouse that risk between the investor that wants to buy and an investor that wants to sell, because they are unlikely to have those desires contemporaneously.

So there are a bunch of pilot programs that are being enacted now on the equity side to try to help with that. I think on the fixed

income side you see an enormous profusion of new networks, new market platforms attempting to facilitate trading between buyers and sellers to try to fill this gap. But without a very diverse set of dealers to be able to do that, you are not going to be successful.

Mr. EMMER. And I guess I will go to Mr. Shay, with whatever time you want to use. Go to your example, we should take the chains off. I am interested to know what regulation, what policy has been instituted on the government side that we could perhaps roll back or modify that has encouraged this getting bigger and bigger and squeezing out.

I appreciate your trying to find a way under the current environment to restimulate the smaller companies and access to capital. But what have we done that has caused this problem in the first place, and can we reverse it?

Mr. SHAY. Just from the sheer size of the major players, and I am talking about in the highly liquid, highly transparent visible markets that we were all impacted by during the financial crisis, you had mergers of these large institutions. You had emergency weddings. You had banks then being sued for everything from foreign exchange issues, ISDA fixing issues, LIBOR. There was one, it was one compliance issue after another.

So the banks—if you are sitting on a trading desk—and to my point about banks have traditionally acted as these risk-transfer agents with large pools of clients, which as a regulator looking at these institutions you want, because you are going to have clients that are naturally offsetting risk within the bank's portfolio.

What caused the market to go the wrong way was a result of risk and leveraged risk—

Mr. EMMER. I think you and I are going to have to continue, and the whole panel. I will be in touch to continue this discussion in light of our time.

Chairman HUIZENGA. The gentleman's time has expired.

With that, last but not least, the gentleman from Maine, Mr. Poliquin.

Mr. POLIQUIN. Mr. Chairman, you always save Maine for last. But that is okay. We don't take it the wrong way. It is still the greatest State in America.

I appreciate everyone being here. I really do. Government should be in the business of helping our families. So if you are poor or disadvantaged or you are disabled or you are a veteran or you are a senior who is trying to save for your retirement years or you are a taxpayer, government should help you. And the decisions that we make here today set policies that make it easier for people like you to help our families in the private sector or not.

Now, I was a State treasurer up in Maine for a period of time, and part of the fixed income market I dealt with was the municipal bond market. And I will tell you, yes, our companies, as Mr. Emmer said and Mr. French said, it's very important they can access capital to expand their businesses and grow, pay their workers more, and hire more workers, because a good job solves a lot of problems.

Also, in the municipal bond market we need to make sure we continue to give our States and cities and towns across America a very low-cost way to borrow money. So it is critically important

that you folks continue to make sure we have liquidity in that market so we can drive down the price if you are a buyer or increase it if you are a seller and make sure interest rates are as low as humanly possible, because of the taxpayers who are paying the interest every 6 months and repayment of principal at the end of the period.

Now, there are some folks in this town, not me, who are floating an idea of taxing municipal bonds. So all of a sudden we have this additional burden, additional cost on the taxpayer to build a new sewage treatment plant in Ellsworth, Maine, or to build a new water treatment facility in Lewiston, Maine.

And I would like to ask you, Mr. Sedgwick, you work for one of the biggest mutual fund houses in the country and you have, I am sure, a significant municipal bond portfolio, tell me what taxation of municipal bonds would do to the infrastructure needs of this country and what it would do to the folks who are saving for their retirement that you service?

Mr. SEDGWICK. I think it is actually a very complex issue. As we look at the tax treatment, for example, with munis, but also with corporate credit, it is actually a very difficult sort of—

Mr. POLIQUIN. I have 2 minutes, and 4 minutes and 13 seconds, before I have to vote. So you have to make your very complex—make it very simple quickly.

Mr. SEDGWICK. I'm sorry. I am not a muni trader, but I can certainly circle back with you and get you a written response.

Mr. POLIQUIN. Great.

Mr. SNOOK, do you have a comment on this?

Mr. SNOOK. Yes. I think we have tremendous infrastructure needs in this country. The municipal tax-exempt market is an extremely well-functioning market. We talked about the fact that there are almost a million separate securities outstanding. That reflects our ability and the market's ability to serve all those issuers well, those small towns, those municipalities, all those different local entities.

And if we take that tax exemption away, we will undermine that market greatly, because when we talk about liquidity and the ability to sell small size, it will be devastating. Right now we have a very strong amount of demand from the individual investor directly through mutual funds. If we were to take that away, we would throw a tremendous cost burden back on those local cities, States, and municipalities.

Mr. POLIQUIN. Thank you.

Mr. SHAY, you have last say. I have 1 minute.

Mr. SHAY. Again, I am not a municipal bond trader either, but I think adding friction to any market is not going to be good for the individuals or the municipalities trying to raise—

Mr. POLIQUIN. Thank you all very much for being here. I really appreciate it.

Mr. Chairman, I yield back my time.

Chairman HUIZENGA. The gentleman yields back.

And with that, I want to say thank you to our panel. Already, we have gotten comments from Members that this was extremely illuminating, very helpful. And as I was starting to say in my questioning, we are really looking for some industry consensus. I don't

know what exactly that means and what we are going to be able to get to. But I deeply appreciate this input and your time and effort being here.

I look forward to working with Chairman Clayton as well at the SEC to see where we can go and work hand-in-hand with them where we are able to.

The Chair notes that some Members may have additional questions for this panel, which they may wish to submit in writing. Without objection, the hearing record will remain open for 5 legislative days for Members to submit written questions to these witnesses and to place their responses in the record. Also, without objection, Members will have 5 legislative days to submit extraneous materials to the Chair for inclusion in the record.

And again, thank you for your time. And this hearing is adjourned.

[Whereupon, at 10:47 a.m., the hearing was adjourned.]

A P P E N D I X

July 14, 2017

**STATEMENT OF MATTHEW F. ANDRESEN
ON BEHALF OF
HEADLANDS GLOBAL MARKETS, LLC
BEFORE THE
SUBCOMMITTEE ON CAPITAL MARKETS, SECURITIES, AND INVESTMENT
FINANCIAL SERVICES COMMITTEE
UNITED STATES HOUSE OF REPRESENTATIVES**

July 14, 2017

Chairman Huizenga, Ranking Member Maloney, and Members of the Subcommittee, I am Matthew Andresen, CEO of Headlands Global Markets, LLC, (“HGM”), as well as CEO of Headlands Technologies LLC (“Headlands Technologies”), an affiliate of HGM. On behalf of HGM and Headlands Technologies, I welcome this opportunity to present our views on market structure in the secondary market for municipal bonds.

Recent regulatory efforts have brought about necessary and important improvements in the transparency and competitiveness of these markets. In this testimony, I will review some of those key achievements, as well as some areas that may be ripe for further improvement—including work that remains to be done to ensure that recently enacted rules are fully enforced for the benefit of all market participants. I will begin first with some background about myself, HGM, and Headlands Technologies, as well as the existing market structure in municipal bonds.

Before founding HGM and Headlands Technologies, I was co-CEO of Citadel Securities LLC (“Citadel”), an affiliate of Citadel Investment Group, LLC in Chicago, a large electronic equities market maker. Prior to Citadel, I was President and CEO of Island ECN (“Island”), the largest electronic stock market in the United States. Island grew from a start-up into the largest

market for the trading of Nasdaq-listed stocks, ETF securities, and many NYSE-listed names. In 2002, we sold Island to its largest competitor, Instinet. The electronic market was then sold to NASDAQ. Currently, I serve on the Securities and Exchange Commission's ("SEC's") Equity Market Structure Advisory Committee, advising the SEC on trading issues.

Our firm is a global quantitative trading company based in Chicago, London, and San Francisco. Founded in July 2009, Headlands Technologies develops and implements quantitative trading strategies in various financial products. It is one of the world's largest trading firms, accounting for significant volumes across global markets. HGM is a SEC registered, Financial Industry Regulatory Authority ("FINRA") member broker-dealer. It launched its municipal bond trading business in March 2014 and uses proprietary models to price bonds electronically. HGM is a widely-recognized participant in the municipal bond market, executing close to 700 trades per day, trading with over 400 counterparties, and ranking as a top participant on all major municipal bond alternative trading system ("ATS") platforms. This volume makes HGM a significant liquidity provider and one of the country's largest dealers in the secondary market for municipal bonds. HGM also engages in transactions directly with institutional counterparties and provides direct prices to certain municipal securities dealers.

Background on the Municipal Bond Market

Local government entities issue bonds in the municipal markets. According to Municipal Securities Rulemaking Board ("MSRB") statistics, approximately \$458 billion in municipal bonds were issued in 2016.¹ Municipal bonds vary considerably in their terms and reflect obligations of a variety of local government entities across the country. Many carry tax advantages making them an attractive investment vehicle for retail investors. As such, retail

¹ See <https://emma.msrb.org/MarketActivity/ViewStatistics.aspx> (last viewed July 3, 2017).

investors hold an estimated 75% of municipal bonds either directly or indirectly (through mutual funds), making them significant purchasers of municipal bonds. Retail investors also trade in the secondary market. According to MSRB statistics, in 2016 approximately 47% of secondary market trades in municipal securities had a value of \$25,000 or less, and 80% had a value of \$100,000 or less – indicating active retail participation in the secondary market trading of municipal bonds.²

The secondary market for municipal bonds has historically been a dealer market. Thus, investors interested in either buying or selling a municipal bond would need to contact a dealer, who would provide pricing information. Although the MSRB has made great strides in providing detailed post-trade pricing data to the public, such information is of limited use to investors if the bond of interest has not traded recently, which is often the case. Moreover, due to the abundance and diversity of municipal bonds, investors may struggle to identify comparable bonds for pricing purposes. Accordingly, retail investors are often dependent on dealers for pricing information.

When dealers trade directly with their own customers, they do so either as a principal, meaning they are trading against their own inventory, or as a riskless principal, meaning they are engaging in offsetting principal buys and sells. Interdealer brokers have also historically been active in the municipal bond market matching buyers and sellers of bonds. They do not directly provide liquidity. Traditionally, interdealer brokers largely had dealers as their clients, but may also have institutional customers. Interdealer brokers may operate in voice or electronic markets.

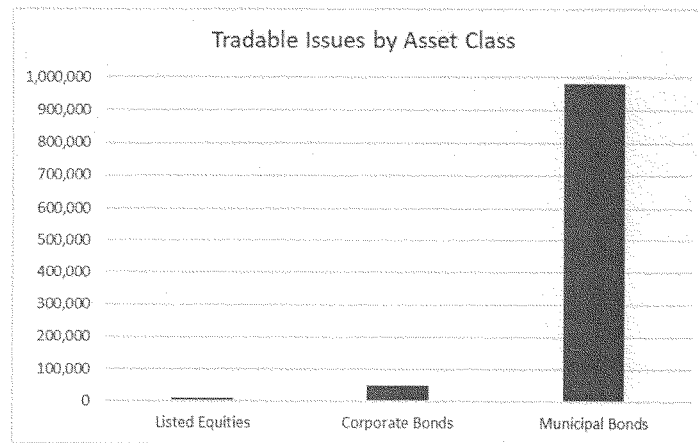
A dealer may also trade as riskless principal by trading bonds between its customers, with one customer buying and another customer selling. When trading with their customers as either a principal or riskless principal, dealers may include a markup or markdown within the price the

² Municipal Securities Rulemaking Board 2016 Fact Book at 37.

customer receives. This means the customer only sees one net price, and may not have visibility into the amount the dealer is charging to facilitate the transaction.

Recent Improvements in Municipal Bond Market Structure

I have spent a good part of my career trading in the equity securities markets, which are liquid and deep markets driven by both real-time customer orders and firm dealer quotes. Although similar pre-trade transparency consisting of firm, streaming quotes would be ideal for municipal bonds, we do not believe that is a practical solution given the vast number of municipal bonds (approximately 1,000,000 unique bonds compared to roughly 4,000 listed equity securities) and the infrequency with which most bonds trade. Rather, due to these unique characteristics, dealer intermediation and liquidity provision will continue to be essential elements of the secondary market for municipal bonds. The market has seen several recent areas of improvement in the transparency and competitiveness of these practices.



Secondary market trades in municipal bonds often occur through auctions administered by an ATS. ATSs, which have become prevalent in recent years, primarily bring together buyers

and sellers of municipal securities by administering auctions and posting dealer offers, but do not themselves take principal risk or directly add liquidity to the market. When selling a bond, investors and intermediaries initiate auctions to request quotes for a “bid price” (the price at which a dealer is willing to buy bonds that the investor is looking to sell). These auctions are known as “request for quotes” or “RFQs”, and they create competition among liquidity-providing dealers. In theory, investors should look to sell at the highest bid received in a “bid wanted” auction. Of course, investors may choose not to sell if the best quote does not meet their desired price. Conversely, when buying a municipal bond in the secondary market, investors and intermediaries review dealer offers posted on the ATS platforms. In theory, investors should look to buy bonds that meet their criteria at the lowest possible offer price.

HGM is a significant participant on the ATSs. It provides approximately 10,000 bid wanted quotes per day. HGM’s quotes end up representing the best price in approximately 25% of the municipal bond auctions in which it bids. On several of the largest ATS platforms, HGM is one of the top 3 bidding participants. Similarly, HGM provides meaningful sell side liquidity by posting offers in well over 3,000 unique bonds each day.

The ATSs have brought positive changes to the municipal bond markets through these auctions by increasing price transparency and liquidity and by helping buyers and sellers find each other. There are consistently more than 6 bidders per auction, and consistently half of bid-wanted requests are duplicated across various ATS platforms, meaning that dealers are seeking best prices and liquidity across multiple ATSs.

Other improvements came about as a result of the SEC’s July 31, 2012 Report on the Municipal Securities Market.³ That report provided an overview of the municipal securities

³ Report on the Municipal Securities Market, U.S. Securities and Exchange Commission (July 31, 2012).

market structure and made several recommendations for improving the structure of the secondary market for municipal securities, including:

- providing more detailed interpretive guidance to assist dealers in establishing the “prevailing market price” for a municipal security, for purposes of determining whether the price offered to a customer (including any markup or markdown) is fair and reasonable.
- requiring municipal bond dealers to disclose to customers the amount of any markup or markdown on confirmations for riskless principal transactions.
- requiring municipal bond dealers to seek “best execution” of customer orders for municipal securities.

These recommendations have been or are in the process of being implemented. For example, since March 21, 2016, municipal securities dealers have been required to provide retail customers with “best execution.”⁴ The best execution rule requires broker-dealers to use reasonable diligence to ascertain the best market for a security and trade in that market so the resulting price to the customer is as favorable as possible under prevailing market conditions. Although the concept of best execution has been around in the equities market for decades, it was not until March of last year that best execution was required for the municipal bond market. Accordingly, the MSRB issued detailed guidance to dealers explaining how to implement that best-execution requirement in the municipal bond market.⁵

Further, the MSRB has amended its rules to require municipal securities dealers, starting on May 14, 2018, to disclose markups and markdowns when engaging in offsetting principal transactions with retail customers. Specifically, the disclosed markup or markdown must be

⁴ MSRB Rule G-18.

⁵ Implementation Guidance on MSRB Rule G-18, on Best Execution (Nov. 20, 2015).

calculated from the prevailing market price. The MSRB also has issued guidance to municipal securities dealers about how to determine the prevailing market price.

The combination of the best execution rule and retail markup disclosure rule are positive developments for which we applaud the SEC and MSRB. We expect these developments will have a beneficial impact on municipal bond pricing as dealers and investors adapt to these new rules and as they are appropriately enforced.

Areas of Possible Improvement

The current combination of “request for quote” auctions and electronically posted offers is efficient and works well in lower liquidity markets, like the municipal bond market. We believe, however, that there is continued room for improvement in the structure and operation of that market. For one thing, many trades are still internalized or conducted “blind” without being offered through any auction at all, and thus do not capture the benefits the auction process has brought to the market. In addition, several anticompetitive practices have developed that we believe limit the advantages of the existing market structure and exert detrimental effects on retail investors.

First, we want to address the practice of filtering. Filtering occurs when a broker-dealer handling its own retail customer’s order (a “retail broker-dealer”) requests a quote or starts an auction on an ATS, but uses automated tools on the ATS to filter out responses from specified dealers. Current MSRB guidance permits filtering only “for a legitimate purpose consistent with obtaining the most favorable executions for [retail] customers....”⁶ But filters are still used in the market today in ways that are difficult to reconcile with the guideline. Dealers commonly engage in both *auction filtering*, where they restrict the set of liquidity providers permitted to participate in retail bid wanted auctions, and *offer filtering*, where dealers limit the selection of

⁶ Implementation Guidance on MSRB Rule G-18, on Best Execution (Nov. 20, 2015) at 7.

offers made available to investors looking to purchase bonds. In both cases, these filtering restrictions on market participation have the same result—retail investors may not receive the best available price.

Moreover, the behavior of retail broker-dealers who utilize these filtering practices often belies any claim that they might have a “legitimate purpose” for employing them. For example, retail broker-dealers may often filter offers from certain counterparties, but allow those same counterparties to bid in bid wanted auctions. Similarly, retail broker-dealers will filter participants from retail bid wanted auctions, but opportunistically trade with those same participants in the voice market. As these filtering practices may prevent investors from receiving the best price, it is difficult to ascertain what “legitimate purpose” might motivate such behavior. Instead, such practices reflect a conflict of interest between broker-dealers and their customers. Though these restrictions may harm investors’ execution quality, the practices clearly benefit the retail broker-dealers whom these investors depend on for pricing information. Auction filtering facilitates dealer internalization of customer sell orders by reducing the competitiveness of the auctions. Similarly, offer filtering facilitates dealer internalization of customer buy orders by increasing the likelihood that these orders execute against the dealers’ own inventory. Accordingly, a focus on whether the continued use of filters is “for a legitimate purpose” may be in order.

Second, we want to address the topic of auction competitiveness. As previously discussed, retail broker-dealers often sell bonds on behalf of customers via bid wanted auctions, during which market participants submit bid prices at which they would be willing to purchase a specified bond. Once an auction has concluded, the customer has the option to either sell the bond at the winning bid price, or pass if the winning bid price is undesirable. In theory, this is

how the process should work. In practice, however, there are many anticompetitive practices which reduce the effectiveness of these auctions and lead to inferior pricing for customers.

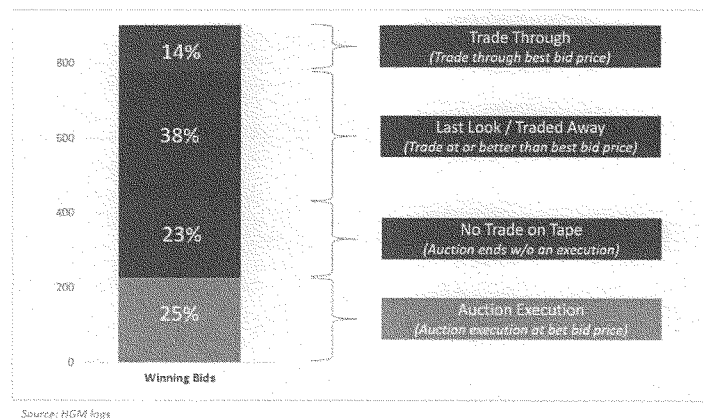
One such practice, known as a “trade through,” occurs when a retail broker-dealer obtains prices for a customer via a bid wanted auction, but then internalizes the order by purchasing the bond from its customer for its own account at a lower price than the winning bid in the auction. In April 2017, this occurred on nearly 15% of auctions in which HGM submitted the winning bid. The price differential may result from the submitting broker-dealer including a “desk credit” – essentially a markdown – in the price at which it purchases the bond from the customer. This practice of internalizing orders and allowing for a trade through is harmful to customers because it results in bonds selling at inferior prices to those that were available at the time of the trade. We are hopeful that, once it takes effect next year, the new MSRB markup rule will help eliminate this internalization and trade through practice by revealing to customers the component of the trade price that reflects retail broker-dealer compensation on principal buy and sell trades.

There are also many cases of retail broker-dealers taking advantage of a process known as “last-look,” wherein the dealer observes the prices submitted to a completed auction and decides to purchase the bond from the customer at a price slightly better than the winning bid, even though such practice appears to be prohibited by MSRB Rule G-43. In April 2017, nearly 40% of auctions in which HGM submitted the winning bid resulted in a trade with a different counterparty at an equivalent or better price; some of these were undoubtedly cases of dealers utilizing their last-look advantage. This process harms auction competitiveness by deterring aggressive pricing or participation by other dealers who know the submitting dealer may “step in front of” their winning bid prices or is otherwise using the auction process solely for price discovery purposes. An alternative approach would be to require the submitting dealer to place

its own prices in the competitive auction on par with all other participants, thereby removing its last-look advantage. This approach would put all liquidity providers on equal footing and encourage more aggressive pricing by auction participants, thereby improving pricing quality for customers. We believe that municipal bond investors would benefit from enforcement against the use of the last-look practice.

To highlight the overall impact of these anticompetitive practices, HGM is the winning bid on over 900 unique auctions each day; however, HGM only receives an execution on 25% of these winning bids.

Bidding Experience in Municipal Bonds



Conclusion

In recent years, we have seen important strides in the competitiveness and transparency of the secondary market for municipal bonds, thanks in large part to the enactment of responsible rules and guidance. We are hopeful that the competitiveness and transparency of the secondary market for municipal bonds will only continue to improve as these rules are implemented into

practice and appropriately enforced by regulatory staff. We appreciate the Subcommittee's attention to these important issues, and we are grateful for the opportunity to join in the discussion as we work together toward continued improvements in enforcing those rules for the benefit of all investors and market participants.

Written Testimony of Jonah Crane
Former Deputy Assistant Secretary, U.S. Treasury Department
before the
House Financial Services Committee's
Subcommittee on Capital Markets, Securities, and Investment
July 14, 2017

Thank you Chairman Huizenga, Ranking Member Maloney and members of the Committee for inviting me to participate in today's hearing. Market structure has been a significant focus of my policy work in each of my jobs here in Washington, as an advisor to Senator Chuck Schumer, a senior advisor at Treasury, then as Deputy Assistant Secretary for the Financial Stability Oversight Council.

I am encouraged that the Committee is focusing on fixed income markets, because these markets are critical to the strength and resilience of the U.S. economy. Fixed income markets are undergoing structural changes—driven by technology, changing risk appetites and business models, financial reform, and changes in the investor base—but have supported record levels of bond issuance over the past nine years.

My written testimony will discuss the primary changes taking place in fixed income market structure, related changes in market liquidity, and important developments in the Treasury market. I will conclude with some recommendations intended to bring oversight of the Treasury market into the 21st Century in ways that facilitate the natural evolution in market structure that is already underway.

Market Structure: Fixed Income Markets in Transition

In non-financial markets, “market structure” generally refers to the organizational and other characteristics of a market—in particular, the competitive dynamics: whether a market is monopolistic, oligopolistic, or highly competitive. Competition is an important aspect of a healthy financial market structure—a topic to which I'll return. But, in markets for financial assets, “market structure” usually refers more broadly to the collection of rules, technological infrastructure, processes, and participants that combine to determine how buyers are matched with sellers.

Liquidity, broadly speaking, refers to the *ease* with which buyers are matched with sellers. Questions about liquidity, which have been much-discussed in recent years, thus inherently raise questions about market structure.

The single most important transformation in financial market structure over the past 20-plus years is the shift, in virtually every asset class, towards electronic trading. This evolution began

in equities in the 1990s, and migrated to futures and foreign exchange (FX) markets. The transition has been slower and uneven in fixed income, but it is clearly underway.

Electronic trading can take many forms. In markets for standardized, benchmark securities, high-speed algorithmic trading, often referred to as high-frequency trading or “HFT,” has become predominant. HFT accounts for a majority of trading in equities, futures, and FX. Algorithmic trading that relies less on speed, but nonetheless automates trading decisions and order execution, is increasingly common in parts of the fixed income market where trading is less frequent, such as corporate bonds or off-the-run Treasuries.¹ Algorithmic trading can be thought of as a subset of electronic trading, and HFT can be thought of as a subset of algorithmic trading.²

As discussed in more detail below, HFT now accounts for a majority of trading in the interdealer market for Treasuries, which in turn accounts for roughly half of all cash Treasury trading volume.³ The other half of Treasury trading occurs in the “dealer-to-client” market, where there is no HFT and, while electronic trading exists, more than half of trades reportedly are still conducted by phone or message.

In corporate bond markets, where the securities are more customized, algorithmic trading has not yet become prevalent, but more basic electronification is growing. To some extent, this simply means the old ways of transacting by phone are migrating to the screen. But a growing portion of corporate bond trading is happening on “all-to-all” venues—that is, trading directly between end investors without a dealer between them. Precise estimates are difficult to come by, but nearly 20% of corporate bond trading is now electronic,⁴ and the most popular all-to-all trading venue for corporate bonds reported record volumes in the first quarter of 2017.⁵

Alongside the transition to electronic trading, fixed income markets are experiencing a shift from “principle-based” intermediation to “agency-based” intermediation.⁶ Historically, fixed income markets have relied heavily on dealers to act as intermediaries, often in a principal capacity. That is, a dealer would step in and buy bonds from a trader who wants to sell, holding the bonds on its own balance sheet until a willing buyer could be found. To compensate for warehousing that

¹ Off-the-run refers to all but the most recently-issued securities of a given tenor.

² See “Electronic trading in fixed income markets,” Bank for International Settlements, *available at* <http://www.bis.org/publ/mkfc07.pdf>.

³ See Joint Staff Report: The U.S. Treasury Market on October 15, 2014, July 13, 2015 (JSR), *available at* https://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf.

⁴ Greenwich Associates, “Understanding the U.S. Fixed-Income Market,” (2016).

⁵ See Rick McVey, *Liquidity in the Post-Crisis Era: The Difference a Decade Makes*, *available at* <http://www.marketaxess.com/trading/opentrading.php>.

⁶ See “Electronic trading in fixed income markets,” Bank for International Settlements, *available at* <http://www.bis.org/publ/mkfc07.pdf>.

risk, dealers would charge a “spread” between the price at which they were willing to buy and willing to sell.

When acting as an agent, a dealer is effectively acting as a broker, matching buyers and sellers for a fee or commission, generally without putting its own balance sheet at risk. Fixed income markets are increasingly shifting toward agency-based intermediation, aided in part by the technological changes discussed above and by the entry of new competitors in the marketplace.

These transitions likely reflect the confluence of several factors. In addition to technology changes that predate the crisis, as discussed above, regulatory reform and changes in business models following the crisis also have likely contributed. Large banks and broker-dealers have significantly reduced their leverage, heightened risk management, and sought more resilient sources of funding.

Changes in Market Liquidity

Some have viewed these changes as detrimental to liquidity in fixed income markets—corporate bond markets in particular. To date, the data do not show a broad-based deterioration in corporate bond liquidity. In fact, by many traditional measures liquidity is at least as healthy as the pre-crisis period. Bid-ask spreads are back at pre-crisis lows, and trading volumes reached record levels earlier this year.⁷ Other liquidity measures show a more mixed picture: average trade sizes are down, as is the proportion of block trades.⁸

In the aggregate, it is difficult to say if liquidity is “higher” or “lower,” but the data are consistent with the trends outlined above: a greater preponderance of electronic trading, and a shift toward agency-based intermediation. That is, the shifts in market structure are changing the nature of liquidity provision.

Recent studies of bond market liquidity appear to support this conclusion. A study by Federal Reserve Bank of New York economists, for example, shows that corporate bonds traded by dealers with high levels of leverage and high reliance on repo funding (i.e., dealers who may face greater constraints as a result of regulatory capital requirements) are less liquid than bonds traded by less-constrained dealers, and those institutions appear to trade less with customers.⁹

Considered in light of the rest of the data, which do not show a deterioration of liquidity overall, the best interpretation seems to be that all of the factors described above are contributing to the

⁷ Data available at <http://www.sifma.org/research/statistics.aspx>.

⁸ For a comprehensive discussion on market liquidity since the crisis, see Market Liquidity After the Financial Crisis, Federal Reserve Bank of New York Staff Report No. 796 (revised June 2017), available at https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr796.pdf?la=en.

⁹ See Tobias Adrian, Nina Boyarchenko, and Or Shachar, Dealer Balance Sheets and Bond Liquidity Provision, Federal Reserve Bank of New York Staff Research Report No. 803, available at https://www.newyorkfed.org/research/staff_reports/sr803.

trend toward more agency- and less principal-based intermediation. This may make larger transactions more difficult to complete, but market participants are responding by looking to technology for more sophisticated trading strategies. Investors are particularly focused on deploying technology in corporate bond markets to improve block trading and execution in high yield bonds—which tend to be less liquid.¹⁰

These trends have occurred against a backdrop of record corporate bond issuance, resulting in the outstanding stock of corporate bonds doubling since 2009. At the same time, the changing profile of the investor base is also altering the nature of fixed income markets. Mutual funds and ETFs now account for nearly 18% of corporate bond ownership, up from 6.3% in 2008.¹¹ The combination of greater difficulty executing large trades and increased bond ownership by mutual funds and ETFs has raised concerns that fund managers might have difficulty managing large redemptions. Mutual funds and ETFs offer their investors much greater liquidity (daily and immediate, respectively) than is typically found in markets for the bonds owned by those funds. The SEC recently adopted rules requiring more stringent liquidity risk management by mutual funds that, if implemented rigorously, should mitigate this risk.

When assessing whether current policy is achieving the right balance, it is important to keep in mind that not all liquidity is created equal. Much of the liquidity apparent prior to the crisis was fueled by excessive leverage, and excessive speculation, on the part of banks and broker-dealers, as trading became a central profit center for the industry. Not only did this liquidity disappear when financial markets became stressed, the rapid unwinding of leveraged positions likely contributed to the panic. Liquidity is an important factor but by no means the only test. Robust liquidity is a feature of a well-functioning market, but it should not be prioritized at the expense of important financial stability safeguards.

“Flash” Events and “Fragile” Liquidity

In more standardized fixed income markets, where algorithmic trading has become prevalent, price-based measures of liquidity such as bid-ask spreads have improved. However, a series of “flash” events in various fixed income markets have raised questions about the nature of liquidity in these markets. While liquidity may have improved in normal times, has it become more fragile—that is, more prone than liquidity supplied by traditional intermediaries to disappear during periods of extreme volatility?

The most notable of these events occurred on October 15, 2014, when Treasury yields dropped 16 basis points in a span of just six minutes, fully recovering only minutes later. The 37-basis point round-trip in yields that day was the fourth largest moves over the past 20 years, and occurred without any apparent fundamental catalyst.

¹⁰ See Greenwich Associates, “Innovations Ease Corporate Bond Trading,” (April 2017).

¹¹ See https://www.ici.org/viewpoints/view_17_corp_bond_etf.

These “flash” events, while not common, nonetheless appear to be a persistent feature of markets with a large proportion of high-speed algorithmic trading. We have seen similar events in U.S. equities (May 2010), Indian equities (October 2012), the Swiss Franc (January 2015), the British Pound (October 2016).¹²

The Joint Staff Report notes that “while liquidity ... on average, may have benefited from the advent of electronic trading, the changing nature of liquidity provision may have increased the likelihood of periodic episodes of intraday volatility.”¹³

Of course, liquidity often deteriorates during volatile periods. One recent New York Fed staff research paper examines three recent case studies, including the October 15, 2014 Treasury flash event, and concludes that “the degree of deterioration in market liquidity was within historical norms, suggesting that liquidity remained resilient even during stress events.”¹⁴ However, that conclusion is based on traditional measures of liquidity, such as bid-ask spreads and market depth. One of the important questions raised by flash events across several markets, and implied by the Joint Staff Report, is whether traditional definitions and measures of liquidity are sufficient in markets where HFT is predominant and flash events may be expected to occur periodically.

The Bank of England has posed similar questions, and attempted to measure the “resilience” of liquidity in various ways.¹⁵ Others have proposed incorporating efficient pricing into the concept of liquidity to account for the fact that, in flash events, prices often move in ways that appear completely untethered from any new information.¹⁶

Treasury Market Bifurcation

October 15, 2014 put a spotlight on the rise of algorithmic trading and PTFs in the Treasury interdealer market, which has evolved into a fully-electronic marketplace, with two primary

¹² The Market Crash of 1987 shared many characteristics with these recent events—the most notable difference being the speed with which recent events have unfolded due to the overall increase in the speed of trading. Indeed, such “failures” may be a persistent feature of all complex systems involving the interaction of social systems with technological ones. The construction of the Millenium Bridge is one example of the failure to take into account the complex interaction of large social systems—in this case the tendency of large groups of pedestrians to simultaneously shift their weight in the same direction. See Dave Cliff & Linda Northrup, *The Global Financial Markets: An Ultra-Large-Scale Systems Perspective*, Government Office for Science (2012).

¹³ See JSR, p. 42.

¹⁴ Tobias Adrian, Michael Fleming, and Or Shachar, *Market Liquidity After the Financial Crisis*, (June 28, 2017), at <http://libertystreeteconomics.newyorkfed.org/2017/06/market-liquidity-after-the-financial-crisis.html>. See also *Market Liquidity After the Financial Crisis*, Federal Reserve Bank of New York Staff Report No. 796 (revised June 2017), available at https://www.newyorkfed.org/medialibrary/media/research/staff_reports/sr796.pdf?la=en.

¹⁵ See Niki Anderson, Lewis Webber, Joseph Noss, Daniel Beale and Liam Crowley-Reidy, “The Resilience of Financial Market Liquidity,” Bank of England Financial Stability Paper No. 34 (October 2015).

¹⁶ Nathaniel Wuerffel, “Market Structure and Liquidity in the U.S. Treasury and Agency Mortgage-Backed Security (MBS) Markets,” May 17, 2016, available at <https://www.newyorkfed.org/newsevents/speeches/2016/wue160517>.

venues (BrokerTec and Nasdaq Fixed Income, formerly eSpeed) that employ central limit order books. As discussed above, PTFs now account for a majority of trading on these platforms, similar to equities, futures, and FX.

Perhaps just as notable, however, is the degree to which the Treasury market remains bifurcated between the client market and the inter-dealer market. The conundrum of the Treasury market is that, despite Treasuries being the most standardized security—issued by a single issuer, in large quantities, at regular intervals in benchmark maturities, carrying no credit risk—roughly half of all trading in cash Treasuries still occurs in the heavily intermediated and largely opaque dealer-to-client markets.

When end users of Treasuries—such as mutual funds or insurance companies—want to trade, they still generally do so only with large bank dealers. And most of this trading is done over the phone. The dealers internalize a great deal of those transactions—that is, offset risk from customer flows across their portfolio—and send the rest to the inter-dealer market. Clients generally don't participate in the more transparent interdealer markets. Furthermore, the dealer-to-client market remains dominated by a handful of large dealers. According to Greenwich Associates, “[t]he top five dealers in U.S. Treasuries handled 58% of client trading volume in 2016.”¹⁷

This bifurcation may be starting to soften. Non-bank dealers have recently begun to provide quotes directly to clients (end users) on Bloomberg and Tradeweb, the two largest dealer-to-client trading platforms.¹⁸ Other initiatives have sought to improve liquidity in less liquid segments of the market. For example, Nasdaq's off-the-run liquidity offering and new players such as OpenDoor, which is bringing together dealers with customers for all-to-all trading sessions of off-the-run securities.

These are, overall, positive trends. Healthy financial market ecosystems, much like biological ecosystems, require diversity—in this case, diversity in sources of both demand and supply for liquidity. The Treasury market's current bifurcated structure makes little sense. But as the events of October 15 illustrate, these benefits come with certain risks.

I expect the advent of trade reporting in Treasury markets to lead investors to take a closer look at how their liquidity needs are being met. Experience in other markets shows that transparency breeds competition, and competition breeds efficiency. The implementation of TRACE reporting for corporate bonds reduced trading costs in that market by as much as 50%, and similar

¹⁷ See Greenwich Associates, “New Landscape in U.S. Treasury Trading Benefits the Buy Side,” (2016).

¹⁸ “Citadel Securities ratchets up fight against big banks,” *Crain's Chicago Business*, June 21, 2017, available at <http://www.chicagobusiness.com/article/20170621/NEWS01/170629970>.

improvements were seen more recently when interest rate swap markets were opened up to competition following Dodd-Frank.

Over time, it is likely that the Treasury market will become a less bifurcated marketplace, one where end users with diverse needs have a spectrum of choices when seeking liquidity. Greater diversity of supply and demand for liquidity will enhance the Treasury market ecosystem, bringing benefits to taxpayers and end investors alike.

Modernizing Oversight of the Treasury Market

The structure of the Treasury market has evolved significantly over the years, and the regulatory framework governing the Treasury market no longer fully reflects who is participating in that market or how they are transacting.

The first step for reform was for the official sector to get access to Treasury transaction data. That proposal became a reality just this week, with Treasury transactions now reported to FINRA's TRACE.¹⁹ Regulators have also established standing information sharing agreements to facilitate joint analysis in response to future events. The implementation of official sector reporting of cash Treasury market transactions was a critical step forward. But there are other important gaps to fill in the oversight framework for the cash Treasury market.

FINRA and the SEC have taken initial steps to re-examine their rulebooks, and determine whether all of the exemptions that historically applied to the Treasury market still make sense. FINRA already proposed, for example, to make rules against front-running customer orders or block orders applicable in Treasury markets.

There are many important ways in which the Treasury market is unique, and its unique status should be reflected in the rules governing trading. But it is a large, standardized, liquid market—the kind of market in other words, where the benefits of transparency and competition are most likely to outweigh the costs.

Therefore, I would argue for a presumption that Treasuries should be traded more or less like other securities, except where the unique features of the Treasury market, and the role of Treasuries in the economy, dictates a different result. For example, the fact that the dollar is a global reserve currency means that central banks and other reserve managers hold large stocks of Treasuries—the largest asset class denominated in dollars—and may need to transact in very large quantities relative to most other traders and most other markets. There are benefits that accrue to the United States as the issuer of the global reserve currency and safe haven asset, so we should be sure to preserve a market structure where very large block trades can be facilitated without being exposed to the market.

¹⁹ See <http://www.finra.org/newsroom/2017/finra-successfully-launches-reporting-treasury-transactions>.

Indeed, this is the approach proposed by the Treasury department last year in suggesting a framework for enhanced public transparency of Treasury market activity. Specifically, Counselor Antonio Weiss proposed three ways to mitigate concerns that had been raised about additional transparency:

- First, appropriate time delays to enable intermediaries time to hedge or find the other side of a trade, especially in less liquid products like off-the-runs or TIPs;
- Second, limitations on disclosure of size for large trades (i.e., masking of block trades) largely for the reasons suggested above; and
- Third, a phased-in, gradual approach over time, similar to the way TRACE was phased in for corporate and mortgage bonds. Gradually phasing in public transparency allows for adjustments along the way, and has the added benefit of facilitating independent analysis of each phase--much like a series of pilots. All told, the implementation of TRACE for corporate bonds took more than three years and involved extensive consultation and adaptation along the way.

In addition, I would urge this Committee and other policy makers to consider the following steps, all of which reflect the work undertaken in the comprehensive review of Treasury market structure we conducted following the events of October 15, 2014:

- **Registration of PTFs.** We know that some of the biggest players in this market are different than they used to be, and are not subject to the same level of oversight as traditional intermediaries—or in some cases any oversight at all. The SEC should require registration of PTFs who are active in the Treasury market. At the very least this would allow the transaction reporting now underway to identify PTFs, who currently do not report trades directly because they are not FINRA members.
- **Registration and oversight of trading venues.** When it proposed revisions to Reg ATS, the SEC asked preliminary questions regarding whether alternative trading systems (ATSs) for government securities should be required to register. The SEC should follow up on those questions by establishing minimum standards applicable to all Treasury trading platforms. The membership and trading rules for these venues should be clear and public, and they should be required to implement important operational risk controls such as Reg SCI. For its part, the CFTC should move forward with Reg AT to address operational risks in the futures market.

- **Central Clearing.** Cash Treasury transactions are not required to be centrally cleared in the way that equities and futures are, and the way most swaps now are following Dodd-Frank—including interest rate swaps, which can act as a substitute for Treasuries. Moreover, many PTFs active in the Treasury cash market are not members of Fixed Income Clearing Corporation (FICC), the central counterparty that facilitates clearing and settlement for a significant portion of the cash Treasury market.²⁰ As a result, PTF transactions are often cleared bilaterally, increasing counterparty risks. Many PTFs limit their overnight exposures, but may rapidly accumulate large intraday exposures. The request for information issued by Treasury in January 2016 asked whether existing the clearing arrangements and margin regime are sufficient or whether reforms are necessary.

Relatedly, increased access to central clearing for repurchase agreement transactions—an important source of financing for Treasury securities—has the potential to both reduce counterparty risk and facilitate the entry of more new competitors in the Treasury market. Concerns have been raised about the impacts of post-crisis reforms, specifically the supplemental leverage ratio applicable to the largest banks, on repo funding. The leverage ratio is an important backstop, and should not be set aside to address marginal concerns about trading liquidity. Instead, policymakers should consider ways to facilitate broader access to central clearing for repo transactions.

As we often reiterated at Treasury, our first maxim in dealing with the Treasury market was “do no harm.” But that does not mean doing nothing. Markets and market participants are evolving, and in the face of this change the biggest risk may be doing nothing at all. I am encouraged by the progress made by the SEC and FINRA to date, and hope that this Committee will work with them and other policy makers to continue on the path of steadily bringing oversight of the world’s most important asset class into the 21st Century.

Thank you and I look forward to taking your questions.

²⁰ See <https://www.newyorkfed.org/medialibrary/media/newsevents/events/markets/2016/keane-102416.pdf?la=en>.



STATEMENT

OF

ALEXANDER SEDGWICK
HEAD OF FIXED INCOME MARKET STRUCTURE & ELECTRONIC TRADING
T. ROWE PRICE ASSOCIATES, INC.

BEFORE THE

US HOUSE OF REPRESENTATIVES

COMMITTEE ON FINANCIAL SERVICES

SUBCOMMITTEE ON
CAPITAL MARKETS, SECURITIES, AND INVESTMENT

ON

A REVIEW OF FIXED INCOME MARKET STRUCTURE

JULY 14, 2017

EXECUTIVE SUMMARY

- We greatly appreciate the Subcommittee’s continuing interest in ensuring the quality and integrity of the fixed income markets. Enhancing the transparency, liquidity, and overall functioning of these markets is critical to the success of millions of American savers who use the types of funds that T. Rowe Price and other ICI members sponsor to gain access to the fixed income markets.
- The fixed income market is a collection of several diverse markets, which differ in terms of the drivers of returns, liquidity characteristics, and the amount of electronic trading that takes place.
- Fixed income products can, and indeed historically have, traded in a variety of ways, and the evolution of market structure in this space has never been—and is not be expected to be—linear. There are ongoing changes in market structure as a function of the market participants and their needs, and tradeoffs with respect to the immediacy of liquidity, depth of that liquidity, and price transparency.
- Fixed income markets provide a critical source of funding to companies and governments. The capital raised in our markets provides growth capital for corporate America to create jobs, fund key infrastructure projects for municipalities to upgrade roads and bridges, and provide a vital funding mechanism for the federal government. The fixed income markets also play a critical role in helping investors achieve important financial goals, as fixed income investments are used by investors to generate returns for pension funds, retirement plans, and college savings.
- Liquidity is a critical element of efficient markets, and is particularly important in the everyday operations of mutual funds like those sponsored by T. Rowe Price. Although liquidity in the fixed income markets can be difficult to measure, it is our opinion that over the past decade, we have seen greater fragmentation, a more bifurcated market, and lower overall liquidity.
- A number of new regulatory requirements, including the Volcker Rule, have limited the incentives for banks to use their balance sheets to engage in market making activities.
- Although there has been no shortage of commentary regarding liquidity risks in the fixed income markets, we maintain a constructive outlook. New technology and other new protocols for trading have given fixed income traders additional tools for sourcing liquidity and, to the extent the markets experience a measured increase in volatility and rise in yields, two-way trading activity may increase.
- With respect to the Treasury market, we generally support the recommendations of the Joint Staff Report on the Treasury flash rally, particularly the utility of enhanced regulatory reporting to help the Department of the Treasury and other stakeholders better ensure an efficient and competitive market for all participants, including funds and other investors.

- Buy-side firms have a range of strong views on transparency and the public dissemination of trading information in the fixed income markets, as well as the utility of existing reporting mechanisms. T. Rowe Price has been and continues to be broadly supportive of greater transparency in fixed income markets, although we recognize risks in this regard. We encourage regulators, both domestic and international, to thoughtfully consider requirements to foster transparency, and then to implement those requirements in phases with regular periods of review and study to minimize any unintended consequences for market participants or market dislocations. This kind of careful approach can produce a transparency regime that appropriately balances the benefits of transparency with the risks to market functioning that may be caused by the public dissemination of sensitive trading information.
- We are excited about the continued development of greater “electronification” in the fixed income markets. Electronic trading (“e-trading”) has proven to be most successful in markets that are characterized by an active and diverse set of participants and a smaller set of homogenous securities that allows buyers and sellers to focus their interest, such as for on-the-run Treasuries and Treasury futures trading. E-trading is less advanced in corporate markets, but it continues to grow steadily. T. Rowe Price believes that removing obstacles to further electronification will improve price discovery, facilitate best execution, and enhance capital formation.

I. INTRODUCTION

Thank you, Chairman Huizenga, Ranking Member Maloney, and members of the Subcommittee for inviting me to testify. My name is Alexander Sedgwick. I am the Head of Fixed Income Market Structure and Electronic Trading at T. Rowe Price, a global investment management organization with \$861.6 billion in assets under management as of March 31, 2017.

In addition to T. Rowe Price, I am also appearing at this hearing as a member of the Investment Company Institute (“ICI”), a leading global association of regulated funds.¹ ICI’s members manage total assets of \$19.9 trillion in the United States, serving more than 95 million US shareholders, and \$5.6 trillion in assets in other jurisdictions.

We greatly appreciate the Subcommittee’s continuing interest in ensuring the quality and integrity of the fixed income markets. The types of funds that T. Rowe Price and other ICI members sponsor play a critical part in capital formation in the United States by investing in the fixed income markets on behalf of millions of retail investors saving for their long-term financial goals. And as such, the fixed income markets play an important role in helping the young invest for their first home, helping parents invest so that their children might attend college, helping in the preparation for retirement, and helping current retirees meet the challenges of retirement. Fixed income market dynamics and factors relevant to trade execution affect our ability to deliver on our investment mandates and, in turn, help our investors achieve those financial investment goals. Enhancing the transparency, liquidity, and overall functioning of these markets is thus critical to the success of millions of American savers.

In the sections that follow, I provide a brief outline on the evolution of the fixed income markets and T. Rowe Price’s role in them, discuss the current state of liquidity in the fixed income markets, and provide T. Rowe Price’s recommendations for enhancing market efficiency. I also discuss some of the promising developments in the electronification of fixed income trading.

II. Background on the Fixed Income Markets and T. Rowe Price

a. Evolution of Market Structure

The history of the government bond market provides a helpful illustration of the evolution of fixed income market structure as it speaks to several important points:

- Fixed income investments can, and indeed historically have, traded according to diverse market conventions.
- Changes in market structure result in tradeoffs, reflecting the relative importance of features like immediacy of liquidity, depth of that liquidity, and price transparency.

¹ Regulated funds include mutual funds, exchange-traded funds (“ETFs”), closed-end funds, and unit investment trusts in the United States and similar funds offered to investors in jurisdictions worldwide. ICI seeks to encourage adherence to high ethical standards, promote public understanding, and otherwise advance the interests of funds, their shareholders, directors, and advisers.

- The evolution in market structure of any fixed income asset class is not linear—rather it is influenced by the needs and constraints of all market participants, including issuers, buyers, sellers and liquidity providers, over time.
- Perhaps most importantly, the participants themselves and their needs are not static but have changed over time.

The evolution of organized fixed income markets in the United States began in 1792 when the New York Stock Exchange was founded primarily as a government bond exchange. Since then, US Treasuries have moved from trading on an exchange to trading over-the-counter (“OTC”) and back several times, largely depending on which market structure best reflected the current needs of investors.

War funding precipitated many of the changes in Treasury market structure. First, the dramatic increase in the funding needs for the Civil War incentivized private firms to act as sales agents, and also provide OTC secondary markets for their customers. Later, the issuance of exchange-listed Liberty loans to fund World War I increased the volumes on the exchange.

This trend reversed in the mid-1920s due to a number of factors: (i) the retirement of war debt; (ii) the growing concentration of new Treasury issues in non-exchange listed securities; and (iii) increased institutional buying from an emerging financial sector. Further gravitation to OTC markets resulted in 1925 when, at the suggestion of the Federal Reserve Bank of New York, Treasury stopped executing its open market operations via the exchange. Moreover, the introduction of the Treasury bill in 1929 as the dominant liquidity instrument of the money market cemented the importance of the OTC market, as only marketable Treasury bonds remained exchange listed. By 1958, trading in government securities on the exchange totaled only \$100,000, compared with \$2.9 billion in 1919.²

As this brief history shows, the evolution of the fixed income market has not been—and should not be expected to be—linear. Moreover, fixed income market structure tends to be a reflection of the changing needs of its participants, the evolution of technology, and underlying financial conditions at the time.

b. T. Rowe Price’s Role in the Fixed Income Markets

T. Rowe Price provides a broad array of mutual funds, subadvisory services, and separate account management for individual and institutional investors, retirement plans, and financial intermediaries using a disciplined, risk-aware investment approach that focuses on diversification, style consistency, and fundamental research. T. Rowe Price sponsors over 175 mutual funds, including over 50 fixed income funds and approximately 40 retirement/target date funds.

² See “Treasury-Federal Reserve Study of the Government Securities Market” (1959), available at <https://fraser.stlouisfed.org/title/317>.

Accordingly, we are a significant participant in the fixed income markets. On behalf of our clients, we participate across a range of investment strategies and fund types. As of March 31, 2017, over \$123 billion of our total \$861.6 billion in assets under management are attributable to fixed income portfolios. Fixed income investments can also play an important role in other types of portfolios managed by the firm, such as target date funds and other asset allocation portfolios.³ Overall, as of March 31, 2017, T. Rowe Price managed over \$195 billion in fixed income investments.

c. The Importance of Fixed Income Markets to Capital Formation

Fixed income markets provide a critical source of funding to companies and governments. The capital raised in our markets provides growth capital for corporate America to create jobs, fund key infrastructure projects for municipalities to upgrade roads and bridges, and provides a vital funding mechanism for the federal government.

The structure of the fixed income markets is more complex than the equity markets because each issuer can issue an array of instruments with varying maturities, debt structures, and covenants.

That diversity of fixed income instruments is an important factor in how T. Rowe Price manages portfolios. The wide variety of bond characteristics including return profiles, maturities, ratings and individual issuers, provides a robust universe of potential investments. Importantly, these characteristics play a prominent role in how we prudently manage risks associated with our investments and how we gain desired exposure. A diverse set of bond characteristics ensures that we can appropriately position a portfolio with the desired credit risk, duration, and industry exposures we need in order to match the investment goals of our clients.

This diverse market structure for debt issuance also provides flexibility to corporate borrowers. It ensures that borrowers can manage their capital structure and debt maturity profile in a flexible manner while also raising capital at attractive interest rates. While the market may over time gravitate to a more standardized structure, we believe any change in this regard would need to balance the needs of issuers with those of investors and should not create an undue preference for secondary market liquidity over the ability of issuers to access capital.

III. Liquidity Considerations in the Fixed Income Markets

The Subcommittee has expressed interest in the current state of liquidity in the fixed income markets and the impact of the domestic and international regulatory regime.

³ As of March 31, 2017, T. Rowe Price manages \$255.2 billion in asset allocation portfolios, of which \$202.6 billion relates to target date retirement portfolios.

Liquidity is a critical element of efficient markets, and is particularly important in the everyday operations of mutual funds like those sponsored by T. Rowe Price and other ICI members, which typically offer their shares on a continuing basis and are required by the Investment Company Act of 1940 (“Investment Company Act”) to issue “redeemable securities.”⁴ Mutual funds must have efficient, orderly markets to invest new cash when investors purchase fund shares or when the fund sells portfolio securities, either in pursuit of the funds’ investment strategies or to meet investor redemption requests. Accordingly, our portfolio managers carefully consider liquidity when making investment decisions, particularly in the fixed income markets. If we are concerned about the possibility that the liquidity of particular instruments could deteriorate in the future, we may need to factor this into portfolio construction.

That said, measuring the liquidity of a market is a challenge. The sections below discuss liquidity in the US Treasury markets and corporate bond markets, and consider the impact of recent regulatory developments in this regard.

a. US Treasury Liquidity

There are a number of common metrics used to measure liquidity in the fixed income market, including the bid-ask spread, depth of market, average trade size and the market impact of trading. The bid-ask spread represents the difference between where a market maker will buy or sell a security. Spreads are typically narrower in frequently traded, liquid securities. The depth of market and average trade size measure the amount that may be traded at the best price and the average size of a trade in the market—in both cases, higher numbers suggest more liquid markets. Finally, the market impact measures the expected market movement associated with a trade and in liquid markets this value is typically small, indicating investors can transact in size without materially altering price.

These common metrics paint a mixed picture on the state of liquidity in the Treasury market. For example, in 2015, staff at the Federal Reserve Bank of New York observed that post crisis bid-ask spreads have been narrow and stable by historical standards. Order depth has varied more over time, recovering after the crisis but declining during both the 2013 “taper tantrum” and the 2014 flash rally. As of 2015, it was not unusually low by historical standards. The same report also found that measures of price impact rose during the same periods of declining market depth indicating periods of lower liquidity. Over this same period, the author noted that trade sizes have decreased. Overall the study concluded that average market liquidity is generally in line with historical standards though there may be reasons to be concerned about liquidity risk—or how resilient liquidity is during periods of stress.⁵

⁴ See Section 2(a)(32) of the Investment Company Act (generally defining “redeemable security” as “any security . . . under the terms of which the holder, upon its presentation to the issuer or to a person designated by the issuer, is entitled . . . to receive approximately his proportionate share of the issuer’s current net assets, or the cash equivalent thereof.”).

⁵ See “Has U.S. Treasury Market Liquidity Deteriorated”, available at <http://libertystreeteconomics.newyorkfed.org/2015/08/has-us-treasury-market-liquidity-deteriorated.html>.

We are encouraged by the efforts of regulators—including those who contributed to the Joint Staff Report⁶ on the 2014 flash rally—to study these market structure issues. We agree with the Joint Staff Report’s recommendations to strengthen the monitoring and surveillance of this market while promoting inter-agency coordination and data sharing. We would also echo the qualification noted in the Joint Staff Report that many of the statistics cited in it and the Federal Reserve Bank of New York report were derived from data collected by inter-dealer trading platforms because a comprehensive data set for the entire market does not currently exist. This lack of a comprehensive, real time data repository undoubtedly delayed the issuance of the Joint Staff Report, which acknowledges:

There are several aspects of the U.S. Treasury and broader U.S. fixed income market that are not represented in this data. For, example cash Treasury market data do not include the large dealer-to-customer market, in which dealers transact—either through voice or electronic means—with their customers.

This “dealer-to-customer market” referenced above is the portion of the market that T. Rowe Price trades in. We would caution that the metrics from the inter-dealer market alone may provide a skewed and incomplete picture of the overall Treasury market, as there are significant differences in the participants transacting in the inter-dealer and dealer-to-customer markets. For example, according to a study⁷ done by the Federal Reserve, the inter-dealer market constitutes approximately 45% of total Treasury trading volumes and approximately 72% of the inter-dealer trading volumes are executed by principal trading firms (“PTFs”) with the balance traded by dealers. Of the top 10 liquidity providers on BrokerTec during a period of months in 2015, only two were traditional dealers. In contrast, dealers continue to provide the vast majority of the liquidity in the client-to-dealer market.

This leads us to two comments on the market structure for Treasuries:

- The Joint Staff Report notes that the proliferation of PTF trading in the inter-dealer market “raises questions about the evolving risks” in this market. T. Rowe Price recommends a review of the regulatory framework that governs liquidity providers in this market, but asks that regulators resist the temptation to import rules or regulations designed for other markets without tailoring them appropriately.
- Both T. Rowe Price and ICI are supportive of the efforts of FINRA to require regulatory reporting of Treasury trades. This reporting requirement, however, applies only to FINRA members – broker-dealers – and not to PTFs, and therefore will provide the official sector with only partial information about the Treasury market. Until regulators are able to obtain a more complete view of market activity, we caution them against using

⁶ *Joint Staff Report: The US Treasury Market on October 15, 2014* (July 13, 2015), available at https://www.treasury.gov/press-center/press-releases/Documents/Joint_Staff_Report_Treasury_10-15-2015.pdf.

⁷ See “Primary Dealer Participation in the Secondary U.S. Treasury Market”, available at <http://libertystreeteconomics.newyorkfed.org/2016/02/primary-dealer-participation-in-the-secondary-us-treasury-market.html>.

the data obtained through this reporting requirement to make more fundamental changes to Treasury market structure.

b. Credit Market Liquidity

In contrast with exchange-traded products like equities, buyers and sellers in over-the-counter fixed income markets frequently access the market at different times. Historically, broker-dealers have been a necessary intermediary providing liquidity, often on demand, for end investors by purchasing bonds from asset managers and other buy-side firms wanting to sell. They would hold these securities for a period of time—which could range from a few hours to several weeks—until they could locate a counterparty to take the other side of the trade, earning a bid-ask spread as compensation for taking risk onto their balance sheets. When markets become more volatile, bank dealers widen their spreads or reduced the size of the trades they were willing to perform to reflect the increased risk and/or reduced price transparency.

At their pinnacle in late 2007, primary dealers' net inventories of corporate bonds exceeded \$235 billion. These positions declined by nearly three-quarters during the credit crisis as banks shed risk and wrote down assets. Inventories then stabilized for a time before declining further as more stringent post crisis banking regulations, including the Dodd-Frank Act and Basel III Accord, increased banks' cost of capital and disincentivized the warehousing of risk. In today's market structure, dealers are still responsible for the majority of corporate bond trading volume and connecting buyers with sellers. However, due to increased regulation, dealers have less incentive to hold securities on their balance sheets for extended periods thereby reducing liquidity. As a result, dealers are increasingly acting in an agency capacity for their customers.

Greater market fragmentation⁸ has also impaired liquidity. A low interest rate environment has encouraged debt issuance, and many companies issued bonds for the first time. Although a flurry of activity from issuers who are new to the fixed income market is indicative of a healthy credit market, it may skew common measures of liquidity. In the secondary market, institutional investors tend to gravitate toward larger more liquid issues in a given capital structure.

Secondary trading volumes have actually been resilient, increasing since the financial crisis despite banks' retreat from market making. However, the overall market grew at an even more rapid clip, leading to greater market fragmentation. Turnover—the ratio of trading activity relative to total market size—in both the investment-grade and high yield markets has dropped to levels below those achieved during the 2008 credit crisis.⁹

However, liquidity is bifurcated. The 1,000 most actively traded bonds have relatively high and consistent average turnover rates (about 150% annually). But excluding these popular, benchmark-names, the rest of the market has much lower average turnover (about 37%

⁸ In equity market structure discussions, "market fragmentation" often refers to the proliferation of trading venues and routing requirements. We use the term here to mean the volume of new issuances and diversity of bond offerings.

⁹ See MarketAxess Research available at http://www.marketaxess.com/research/market-insights/turnover_high_yield_usa.php.

annually). This larger, less-liquid market segment has grown significantly with the surge in new issuance, explaining the decline in overall turnover.

Another notable development in the post-crisis environment is a marked decline in the average size of trades. This is attributable to several factors. In the low-rate, low-volatility environment that prevailed in recent years, there have been fewer large, conviction-driven trades. With dealers less inclined to use their balance sheets to broker trades, institutional investors like T. Rowe Price are being more strategic about trade execution, splitting up large trades into smaller ones and executing with a greater number of counterparties. As we will discuss, investors are increasingly utilizing electronic trading platforms, where average trade sizes are lower.

In a liquid market of any sort, there are multiple buyers and sellers looking to exchange a particular asset for cash at a given time. This enables rapid execution and clear, competitive pricing. However, this situation rarely occurs in fixed income markets, which are fragmented into a number of distinct sectors. Within each sector, there are thousands of individual bonds, each with unique characteristics—yield, duration, quality, subordination level, etc.—that appeal to different types of investors. Some long-term investors buy and hold to maturity, removing bonds from circulation after issuance.

Only a fraction of the corporate market trades on a daily basis. In the U.S. high-grade market, on any given day only about a quarter of the approximately 20,000 bonds outstanding traded on at least one side of the market (i.e., bought or sold) last year. As trade size increases, the number of bonds with daily liquidity shrinks. Looking at trades exceeding \$1 million, a common size for institutional investors, on an average day only 431 index-eligible bonds—less than 7% of the investable universe—were bought and sold.

c. Impact of Regulation on the Fixed Income Markets

A number of new regulatory requirements have limited the ability of banks to use their balance sheets to engage in market making activities. This includes the Volcker Rule, which seeks to restrict banks from using their own resources to trade for purposes unrelated to serving clients and address perceived conflicts of interest in certain transactions or relationships.¹⁰

After the financial crisis and the ensuing regulatory reform, the role of dealers has changed, with resulting effects on the fixed income markets. The Volcker Rule, for example, has compelled large banks to spin off or wind down their proprietary trading operations. These “prop desks” used their bank’s capital to profit from short-term market dislocations. Although speculative traders rather than pure market makers, prop desks frequently served as a source of uncorrelated demand when buy-side investors needed to sell particular securities. Today their role is diminished, and remaining investors often find themselves on the same side of the market.

¹⁰ To accomplish these goals, the Volcker Rule prohibits banks and their affiliates and subsidiaries (referred to as “banking entities”) from engaging in “proprietary trading.” There are exclusions for “permitted activities,” such as market making, as defined in the statute and implementing regulations. The Volcker Rule also generally prohibits banking entities from sponsoring or investing in hedge funds, private equity funds, or other similar funds (referred to as “covered funds”).

The role of dealers more generally has changed as well, with dealers reducing inventory and acting more in an agency capacity for their customers. Dealers may have chosen to reduce their holdings of corporate bonds for a number of reasons, including the Volcker Rule and other regulatory requirements. Given the central role that dealers have played in providing liquidity in a principal capacity in the corporate bond markets, these changes have led to a shift in the fixed income trading environment.

d. T. Rowe Price's Outlook on Fixed Income Market Liquidity Risk

There has been no shortage of commentary regarding liquidity risks in the fixed income markets. However, we see several reasons for having a more constructive outlook.

Dealers are making more efficient use of their smaller balance sheets through technology, and institutional investors have responded in kind. It is still too early to tell which of the new trading protocols will gain traction, and e-trading will not be a panacea for liquidity shortfalls at times when risk aversion is high and buyers are scarce. That being said, it is positive to see new ideas being tested, and our fixed income traders are taking advantage of having more tools at their disposal for sourcing liquidity.

As noted above, stricter regulations have made bond trading less profitable for banks. In addition, an environment of low volatility, yields, and credit spreads has also reduced incentives for banks to make markets. It is difficult to assess whether stricter regulations or the market environment has had a greater impact in discouraging banks from trading more. In any case, if there is a moderate increase in volatility as the Fed gradually tightens monetary policy, bid-ask spreads could widen from today's tight levels, enticing market makers to allocate more capital to facilitate secondary market trading.

An uptick in volatility also should encourage market participants to develop differing views of value, which is critical for creating more vibrant markets with a diverse pool of buyers and sellers. In the recent environment, trading activity has been highly correlated, and compelling relative value opportunities have been harder to find. A measured increase in volatility and rise in yields should foster an increase in two-way trading activity as investors' assessments of a bond's fundamental value diverge.

An increase in rates would likely pull investors with substantial buying power—such as insurers, pensions, and sovereign wealth funds—off the sidelines. As evidence, when Treasury yields rose sharply in mid-2013 during the “taper tantrum,” we witnessed a surge in trading flows into the long end of the curve, which helped to calm the bond sell-off that followed. Dislocations in certain market segments may also attract crossover and speculative investors, such as hedge funds, into sectors that they normally ignore.

Finally, in recent years it has been relatively easy for institutional investors to gain credit exposure through the primary market. The flood of new supply made secondary trading less essential. However, if rates start to rise and companies become less keen on raising new capital in the credit market, we expect renewed focus on secondary market trading.

While liquidity risk is always a consideration in investment decisions, we should note that less liquid markets can also work to the advantage of long-term investors and create excess-return opportunities. We believe that managers who are diligent with risk management, emphasize in-depth fundamental analysis, and hold sufficient liquid assets in portfolios—to both meet redemptions and benefit from security mispricings—may be able to profit from less liquid conditions. To this end, T. Rowe Price fixed income managers continually engage with the firm’s trading specialists, credit analysts, and quantitative analysts to assess market conditions and valuations, evaluate potential risks for portfolios, and identify opportunities to both source and supply the market with liquidity.

IV. Transparency

Buy-side firms have a range of strong views on transparency and the public dissemination of trading information in the fixed income markets, as well as the utility of existing reporting mechanisms. T. Rowe Price, for example, has been and continues to be broadly supportive of greater transparency in fixed income markets. We believe that greater pre-trade price information supports the price formation process, ensuring that buyers and sellers can negotiate a mutually agreeable trading price, and consequently supports liquidity. Moreover, greater market transparency supports the ability of fund managers to provide more granular information to the public about the performance of their investments and the costs of transacting in the market.

At T. Rowe Price, as we look at transparency efforts across the globe, we continue to advocate for an approach similar to that taken by FINRA in the introduction of the TRACE system. The introduction of TRACE included a phased-in approach with regular periods of review and study. Further, as the system has been extended to other asset classes, the level of transparency and the specific information disseminated has been adjusted based on the nuances of each market and individual transactions. We see this as a careful approach that has produced a transparency regime which is helpful to regulators and market participants alike.

Greater transparency in the OTC markets also may raise risks, however. Some have expressed concerns that the public dissemination of trading data may reduce liquidity and impair market quality to the detriment of the markets and their participants.

Regulators need to appropriately balance the benefits of transparency with the risks to market functioning that may be caused by public dissemination of sensitive trading information in an effort to ensure efficient and competitive OTC markets for all participants, including funds and other investors. To that end, we encourage regulators, both domestic and international, to take a thoughtful and measured approach to transparency in the fixed income markets, with careful analysis of data over an extended period of time including a variety of market conditions.

V. Electronification and Technology Across Markets

Because of the challenges of directly matching buyers and sellers of bonds, developing alternatives to the traditional dealer-centric model to enhance liquidity is not a simple task. Nonetheless, there have been some promising technological developments in the form of new e-trading platforms.

The more established systems debuted in the early 2000s. These multi-dealer platforms essentially applied technology to add scale to the traditional request-for-quote model: investors place a trade request, dealers respond with prices, and investors decide whether to accept the best offer. More recently, several new entrants have experimented with less conventional protocols, including auctions; dark pools; and “all-to-all” systems that seek to cross trades between any interested party, whether on the buy side or sell side.

E-trading is less advanced in corporate markets, but it has grown steadily. According to a recent report from Greenwich Associates, 19% of investment-grade corporate trading volume was executed electronically in 2017. E-trading accounted for just 11% of volume in the high yield market, where bond structures and covenants are more tailored to issuer-specific credit risk, and liquidity can be especially constrained for distressed names or smaller and less frequent issuers. But the report predicts that high yield will be a growth area, with several new trading platforms focusing on less liquid securities.

E-trading has proven to be most successful in markets that are characterized by an active and diverse set of participants and a smaller set of homogenous securities that allows buyers and sellers to focus their interest. For example, there has been a high level of adoption for on-the-run Treasuries and Treasury futures trading, as many different market participants use U.S. government instruments for a variety of purposes, including for hedging and collateral. Foreign exchange is another market where electronic trading has been very effective, as there is widespread demand for specific currency exposures and hedges.

It is T. Rowe Price’s view that greater transparency naturally fosters electronification, which improves price discovery, facilitates best execution, and enhances capital formation. We would encourage regulators to consider requirements that would increase transparency as a way to encourage greater use of e-trading. In addition, given the proliferation of e-trading platforms, regulators might consider standardized reporting for trading volumes, which would help market participants evaluate which platform may meet their needs for a set of transactions.

* * * *

I appreciate the opportunity to share these views with the Subcommittee. As I said at the outset, the fixed income markets play an important role in helping millions of Americans save and invest, and enhancing the transparency, liquidity, and overall functioning of these markets is critical to their success. We greatly appreciate the Subcommittee’s continuing interest in these issues.



Testimony of John Shay
Senior Vice President and
Global Head of Fixed Income and Commodities
Nasdaq
Before the
House Financial Services Committee's
Subcommittee on Capital Markets, Securities, and Investment

Thank you Chairman Huizenga and Ranking Member Maloney for the opportunity to testify today on fixed income market structure. The market for U.S. Treasury Securities ("USTs") is widely recognized to be the most liquid and consequential market in the U.S. and perhaps the world. Trillions of dollars of USTs circumnavigate the globe, trading across, and resting in, the accounts of individual investors, institutions, corporations, and governments on every continent. Trillions of dollars more in derivatives on USTs trade separately and just as actively. The U.S. Treasury Bond reflects the stability of the United States and its strength and is, quite literally, the coin of the realm for the world. That said, the market for USTs could benefit from greater transparency, organization and efficiency.

As you know, Nasdaq has extensive experience operating markets and protecting participants and investors. We operate 25 exchanges and six clearinghouses around the globe for equities, options, commodities, power, freight, interest rates, and fixed income trading, as well as providing technology to power more than 70 other brokers, markets, and regulators around the globe. With Nasdaq Fixed Income (NFI), previously known as eSpeed, with its lineage as the first electronic trading platform for Core Benchmark USTs, providing real-time institutional



trading of benchmark USTs and is one of the largest and most liquid fixed-income cash markets in the world. Currently our client profile features 112 Institutional Clients consisting of 23 Primary Dealers, many Banks and Broker Dealers, Proprietary Trading Firms and a number of non-banks. We offer trading through our SEC registered Alternative Trading System (ATS) and Financial Industry Regulatory Authority (FINRA) regulated broker dealer entity utilizing an anonymous, fully electronic central limit order book using price time priority. Currently, among our competitors, our activity represents around 20% of the daily market share. Competitors in our space includes NEX (Brokertec), BGC, and DealerWeb. On the Nasdaq Fixed Income - US Treasury platform we offer:

- US Treasury active Benchmarks. 2yr, 3yr, 5yr, 7yr, 10yr, and 30yr.
- In addition the most actively traded US Treasury T-Bills, newly announced supply and short dated notes.
- Recent enhancements included “Off-The-Run” product offering which are previously issued US Treasury Notes.

Our market continues to evolve with the release this year of several functionality enhancements that we believe will make us the market leader:

- **Nasdaq FIRST:** Allows users to provision additional liquidity between the bid-offer spread. When better pricing is available, the Nasdaq Fixed Income Front-end GUI will display an asterisk (*) indicator on the Bid / Offer Price.



- **Off-the-run (OTR) Swaps:** Nasdaq Fixed Income is offering a new Price Swap Box for trading off-the-runs.
- **Best Price Accelerator (BPA):** When a new price is entered that improves the current BBO spread, trade state will immediately end and start a new trade state at the better price. In the event of a Trade Through scenario, we display the aggregate total size filled through our interface.
- **Show Instrument Trade History:** The new trade history window will show all trades in detail in the instrument you want to view.

Nasdaq's analysis of market structure and market structure reforms is driven by the application of core principles derived from this experience. Nasdaq believes that the market for USTs can be significantly improved on in each of these measures:

- ***Transparency Benefits all Market Participants.*** Markets must be transparent in each of several respects to serve market participants and investors fully and fairly. The structure, regulation, and operation of the market should be readily understood to inspire trust and confidence. Widespread availability of the best available prices ensures that market participants make informed investment decisions and receive high quality, low cost service from intermediaries and markets alike.
- ***Regulation Must be Clear, Consistent, and Technology Driven.*** Markets and market participants should be held to clear, high, and consistent standards of conduct. As markets evolve and automate, regulators must maintain a coordinated and complete view



of market activity. Full transparency to regulators underpins fair markets.

- ***Competition on a Level Playing Field.*** Market structure serves market participants best by including a diverse set of participants. The open interaction of diverse trading interests and strategies – whether long term, short term, institutional, or proprietary – promotes continued innovation and efficiency.
- ***Equal Access to Trading Promotes Efficiency.*** Equal access fosters order interaction, price discovery and market efficiency. Restricted access and liquidity fragmentation creates order isolation, price opacity and inefficiency.
- ***All Investors are Entitled to a Fair Deal.*** The quality of execution for market participants should not depend on the venue they choose. If all venues that trade the same securities are equally transparent, equally regulated, and held to equally high standards of conduct, investors will be fairly treated.

These markets are evolving and they are becoming more fragmented and segregated; more opaque to competitors and regulators alike; subject to uneven and uncertain regulation and enforcement; less efficient; and less clearly focused on serving market participants. Therefore, Nasdaq recommends the following basic improvements that it believes are necessary to better serve market participants and protect investors:

1. Transparency: TRACE Reporting to FINRA was a positive step; further evolution



towards a comprehensive, centralized reporting mechanism is critical.

2. The establishment of minimum regulatory requirements on all venues to ensure fair and orderly markets.
3. Reduce systemic risk by requiring cost effective clearing of all transactions, be it centralized or through an interoperable model for all market participants.

By introducing these changes, Nasdaq believes that operational and systemic risks will be reduced and market efficiencies will be improved.

Current State of the Market

As it is generally known, the secondary market for USTs has two segments: the Dealer-to-Customer segment and the Inter-Dealer Broker (“IDB”) segment. NFI operates exclusively in the IDB segment, offering a Central Limit Order Book (“CLOB”) based on Price/Time matching principles.¹ As such, NFI provides a venue through which dealers can trade in ways that facilitate their customer-facing business. For example, a dealer can access liquidity in Nasdaq Fixed Income to rebalance inventory in reaction to a large customer trade. A liquid, well-functioning IDB market therefore ultimately benefits end investors.

¹ As opposed to “Workup” matching protocols, offering exclusivity and queue priorities originally introduced in early IDB solutions. These are no longer available on eSpeed for Treasury Benchmark securities.



The post financial crisis regulatory framework has impacted traditional providers of liquidity, mainly the enhanced compliance and regulatory burdens of the Volcker Rule² and Basel III Capital Requirements.³ Principal Trading Firms (“PTFs”) have become an increasingly important part of the IDB market, and currently represent a significant portion of Nasdaq Fixed Income activity. PTFs act as both liquidity providers (submitters of passive bid and offer quotes) and liquidity takers. This latter role is often associated with a variety of arbitrage strategies that tie together the prices of related asset classes, such as prices in the futures markets with prices in the cash market. PTF participation increases liquidity and price discovery in the IDB market. These PTFs have accounted for a substantial increase in trading volumes without any significant increase in overnight risk. Liquidity provisioning PTFs facilitate risk transfer while continuing to allow primary dealers to serve the buy side.

In response to the October 2014 market volatility in Treasuries, the Treasury Department and the SEC asked the FINRA to require their member firms to report their transactions so that the information can be made available to regulators. While this step is a good and reasonable place to start, it is not complete. As an operator of one of the primary UST venues, Nasdaq cannot completely evaluate the liquidity and/or efficiency of the entire market either in real-time or on a delayed basis. Nasdaq Fixed Income can only assess the activity on its own platform and

² See 79 F.R. 5808 (January 31, 2014); §619 (12 U.S.C. § 1851) of the Dodd-Frank Wall Street Reform and Consumer Protection Act.

³ See <http://www.bis.org/bcbs/basel3.htm>.



does not have visibility into the best prices currently available or those recently executed at competing CLOBs or Single/Multi Provider Streaming (“SMPS”) or Request For Quote/Request For Stream (“RFQ/S”) venues.

The challenges of incomplete information is also compounded by the proliferation of trading venues and the resulting fragmentation. Since the introduction of Nasdaq Fixed Income, the number of CLOBs has grown from one to three (with more signaling that they will enter the market) and the emergence of several SMPS and RFQ/S solutions.

As this Committee is aware, the U.S. equities markets have experienced a similar proliferation of venues and similar fragmentation. However, the one true strength that mitigates some of the negative effects of fragmentation in the equity markets is the wide availability and cost-effectiveness of real-time data about prices and liquidity each security. Although we are not advocating for something similar to Regulation NMS being applied to the UST market, better regulation developed on a stronger base of transparency and coordination, would be an improvement to that which currently exists in the UST market today.

Without consistent rules and oversight of all liquidity pools, including private venues, fragmentation may lead to reduced levels of liquidity and wider spreads for those ineligible to participant in those private venues. Current regulations are largely focused on financial risk mitigation, leaving a number of important areas unaddressed such as trading infrastructure, system resiliency, technology requirements, and operating standards across venues. Nasdaq



notes that it voluntarily publishes its operating manual online for the benefit of its market participants.

Perhaps understandably, the significant increase in the levels of automated trading has necessitated the development of advanced automated risk control systems. The leading marketplaces, such as Nasdaq Fixed Income, utilize a suite of financial risk management controls based on the SEC Market Access Rule,⁴ including daily trading limits, profit and loss (“P&L”) and market risk monitors, as well as counterparty credit monitoring processes. Many of these and other risk management solutions are widely available to market participants and are supported by a network of third party vendors who specialize in the provision of this technology.

We advocate for the implementation of uniform standards with respect to these areas, accompanied by greater supervision, provided that it is applied equally across all venue types, including CLOBs, SMPS and RFQ/S systems. We welcome competition, as long as it is based upon sound fundamental and operational structures.

⁴ See SEC Rule 15c3-5, 17 C.F.R. 240.15c3-5.



Recommendation Number One: 1. Transparency: TRACE Reporting to FINRA was a positive step; further evolution towards a comprehensive, centralized reporting regime is critical. .

As previously stated, the incremental action to require FINRA members to report trades for regulatory purposes is a positive step, but will only bring transparency to a limited segment of Treasury market activity. Nasdaq believes that UST regulators should establish a truly comprehensive central registration and transaction reporting regime for their own use in the UST market, preferably based upon existing proven industry protocols, and encourage venues to offer services for the submission of transactions to reduce the overall impact on market participants. A comprehensive system would gather all transactions, including those executed on CLOBs, those executed on SMPS and RFQ/S platforms, and those executed bi-laterally between participants. A system that focused on creating transparency in just one segment of the market, such as IDBs, may encourage participants to shift transactions to segments of the market that remain dark, and therefore fail to capture the true breadth of transactions within the marketplace. The case for full and immediate data transparency to regulators and increased public transparency of venue operating guidelines is abundantly clear.



Nasdaq also supports price transparency. Strong reference prices created by exchanges, Trade Reporting Facilities,⁵ and network processors⁶ through the SEC's transaction reporting regime have helped make those markets the deepest, most liquid markets in the world. In fact, Nasdaq has been a leader and innovator in supplementing that already-strong transparency with an even wider and deeper range of "non-core" data products that provide market participants greater freedom to choose pre- and post-trade data. While Nasdaq does not support radical change in this area, preferring a more cautious and incremental approach to regulatory reform. Full pre- and post-trade transparency requires a level and breadth of technical infrastructure that does not currently exist in the market for USTs. For example, trading venues and market participants must operate under uniform quoting and trading conventions before data from multiple venues can be aggregated. Also, quotations must be uniformly accessible, requiring connectivity and operational frameworks.

Investor protections, considered standard in the equity and options markets, are unavailable to UST market participants due to the lack of a comprehensive, centralized reporting mechanism. Every protection offered in response to the equity "flash crash" of 2010 depends on centralization and cooperation; this includes market-wide and single stock circuit breakers, and standardized market making and trade break rules. Enforcement of best execution and trade through protection are facilitated by the same coordination and centralization. Reasonable minds

⁵ See FINRA Rule Series 6700-6770.

⁶ See 15 U.S. Code §78k-1, Exchange Act Section 11A; see also SEC Rule 603 of Regulation NMS, 17 C.F.R. 242.603.



can differ on whether all of these protections are currently necessary in the UST market, but it is clear that proponents would be seriously hindered by the current market structure. On October 15, 2014, the current market structure, as we know it today, experienced an unusually high level of volatility and significant price movements. It is important to state that such events are not common in the UST markets - absent market or policy driven announcements. October 15th prompted five Federal Agencies to review the day's events along with trading data. The resulting findings report published July 13, 2015 noted that while banks and non-banks continued to execute transactions, non-banks firms represented more than half the traded volumeⁱ.

Recommendation Number Two: Impose minimum regulatory requirements on all venues to ensure fair and orderly markets.

Well-functioning markets must be transparent, fair, and orderly. This requires uniform minimum regulatory standards across all trading venues, whether electronic multiparty trading platforms or bi-lateral dealer-to-customer arrangements. For example, rules similar to Regulation SCI,⁷ recently implemented by the Securities and Exchange Commission to enhance the technology infrastructure of securities markets, would ensure that participants in the UST markets develop systems with sufficient capacity, resiliency, availability and security to minimize the

⁷ See 17 C.F.R. Parts 240, 242, and 249; <https://www.gpo.gov/fdsys/pkg/FR-2014-12-05/pdf/2014-27767.pdf>.



occurrence of disruptive systems issues. SCI also provides requirements for industry-wide testing that could enhance the stability of these markets.

It is critical that trading venues do their part to keep bad actors out of the treasury market. NFI is operated by a FINRA-regulated broker dealer and SEC-registered ATS and upholds its duties through a holistic vetting process that includes robust Know Your Customer and Anti-Money Laundering monitoring standards under the USA PATRIOT Act. NFI uses a third party vendor to investigate each prospective customer by comparing customer information against 120+ government-managed lists and websites for any potential negative information. Resources used for this review include lists and websites maintained by agencies such as the Office of Foreign Assets Control, Federal Bureau of Investigation, Department of Justice, Securities and Exchange Commission and Financial Crimes Enforcement Network.

NFI does not allow any customer to access the ATS prior to receipt of confirmation of clearance. Additionally, NFI engages this same third party vendor to conduct continuous real-time monitoring on all of its customers and receives alerts whenever negative news associated with a customer is obtained.

Beyond minimum regulatory standards, Nasdaq believes that market protection requires sound surveillance and monitoring to ensure fair and orderly markets. The securities and futures markets have developed a tiered approach to market surveillance with individual firms and



trading platforms tasked with compliance monitoring of their activity, and self-regulatory organizations (“SRO”) given front-line responsibility for market surveillance and enforcement.

In the UST market, as with our other markets, Nasdaq has implemented operational and compliance best practices to promote and maintain the integrity and efficiency of Nasdaq Fixed Income, and the overall UST market. Similar to other securities and futures markets, Nasdaq Fixed Income employs its own surveillance program, which is designed to review its participants’ trading activities for instances of manipulative or deceptive practices. Surveillance reviews currently deployed or in development include manipulative wash trading, spoofing, layering, mid-point price manipulation, and flipping. Each UST venue should perform similar market monitoring surveillance for the activity related to that venue. In addition, Nasdaq believes the UST market would benefit from consolidated surveillance by a SRO with regulatory responsibility for the trading activity.

Of course, proper surveillance of a fragmented UST market requires that regulators have visibility across all UST cash and derivative markets with the ultimate goal of efficiency and transparency. Regulators could significantly benefit by being a central repository of information to monitor trading across the UST cash and derivative markets using order and transaction activity. This could be accomplished by using trade data similar to that which is available to FINRA from the securities exchanges.



In summary, we strongly advocate for the standardization of regulatory standards and surveillance practices across all UST venues. This would benefit market participants, regulatory agencies, and potentially a centralized clearing provider should the UST markets evolve in that direction. In setting these standards, we believe regulatory agencies should leverage models similar to those that already exist in the securities markets (such as Regulation SCI, SRO oversight, the Consolidated Tape, and TRFs) before devising new sets of rules or requirements that might have unintended consequences on the UST market.

Recommendation Number Three: Reduce systemic risk by requiring cost effective clearing of all transactions, be it centralized or through an interoperable model.

The clearing market structure, in our view, has fallen behind the realities of automated trading. The uneconomical cost of clearing large volumes of trades with very small net positioning has resulted in the majority of trading that occurs in the UST market being done without utilizing a centralized clearing counterparty (“CCP”). This development poses material counterparty risk to the market. The market instead relies on the solvency of the trading venues and an ever diminishing number of Clearing Brokers.

Clearing Brokers are the only third-party that can view a client’s full trading position, as they typically act as settlement agents. Trading venues only receive an incomplete view based upon the transactions being executed on their platform. However, Clearing Brokers acting as agent are not legally bound to guarantee the settlement of executed trades. This exposes



trading venues and market participants to counterparty risk and it creates a scenario whereby default management must involve multi-lateral coordination of clearing brokers, trading venues, and clients, thus adding unnecessary complexity and risk to the market.

To mitigate counterparty risk, Nasdaq Fixed Income has implemented a suite of pre-trade and post-trade risk controls as well as a thorough credit review of clients that do not clear trades. The Nasdaq Fixed Income Credit Risk team conducts annual credit due diligence exercise to evaluate each client's management and firm history, trading strategies, risk management policies and procedures, operational controls and compliance, financial condition, and past performance. This data is used to assess each client's credit quality, which drives client daily trading limits and any collateral posting to Nasdaq Fixed Income. This is supplemented by market risk monitoring of unsettled trades and internal default management policies and procedures. For example, real-time P&L monitoring will alert the Credit Risk team to any unusually large client P&L or exposure that exceeds pre-determined thresholds.

In addition to the counterparty risk associated with the clearing structure currently in place, there are very large inefficiencies in terms of the required collateral for clients to trade effectively across the different venues. Cash trades done on different venues require individual margin postings that do not net across a client's positions. Also, trades done in the futures market against cash positions do not always receive the benefit of netting and require even more collateral. A centralized clearing solution would very likely help to significantly reduce



counterparty risk (and help the default management process) while making the collateral margin requirements reflect the actual risk being taken by particular entities.

In summary, the lack of a centralized clearing solution poses material counterparty risks to the market and leads to the following:

- Less transparency as to the size of the exposure faced by individual participants;
- Concentration risks that are not properly managed;
- Clients having to post collateral to multiple venues and brokers creating inefficient management of settlement and counterparty risk; and
- A decentralized default management process that is cumbersome and prone to delays and errors, thus increasing the chances of financial losses and/or subsequent litigation.

We believe that, so long as market liquidity is maintained, the ideal clearing solution involves a CCP, be it centralized or through an interoperable model, as is the case with many asset classes. The CCP has a complete view all trading by all participants. It is ideally suited to provide uniform capital and risk controls applied equally to all market participants.

The caveat is that clearing costs represent a frictional market force which leads to either a virtuous or a vicious cycle. Lower costs lead to more liquidity and less market risk, while higher costs lead to less liquidity and more market risk. The virtuous cycle would be aided, for example, by a model including intra-day netting because allowing immediate offsetting of



positions would reduce both systemic risk and member margin requirements. The relationship between risk and cost closes the cycle. Lower risk leads to lower clearing costs and vice-versa. Thus, it is imperative that the CCP be cost efficient and well governed, having representation from a cross-section of all market participants.

We appreciate the opportunity to testify on these important issues. I am happy to answer your questions.

⁴ Summary Section 3 of the Joint Staff Report of July 13 2015.



Written Testimony of Randolph Snook

Executive Vice President

Securities Industry and Financial Markets Association

before the U.S. House of Representatives

Committee on Financial Services

Subcommittee on Capital Markets, Securities, and Investment

Hearing entitled “A Review of Fixed Income Market Structure”

July 14, 2017

Chairman Huizenga, Ranking Member Maloney, and distinguished members of the Subcommittee, thank you for providing me the opportunity to testify today on behalf of the Securities Industry and Financial Markets Association (SIFMA)¹ and to share our views on the structure and health of the U.S. fixed income securities markets. SIFMA represents a broad range of financial services firms active in the fixed income markets and is dedicated to promoting investor opportunity, access to capital, and an efficient market system that stimulates economic growth and job creation. The U.S. fixed income markets are a fundamental tool for raising investment for businesses, homebuyers, and the federal government itself. This Subcommittee's oversight of the fixed income markets and the regulatory framework that supports them is critical to protecting market efficiency and access to capital.

This testimony will go into more detail on each asset class but let me state up front that the U.S. fixed income markets are truly without parallel. Total outstanding fixed income debt is almost \$40 trillion dollars, with new issuance in the range of \$6 to \$7 trillion per year over the last 5 years. On average \$775 billion of securities are traded each and every day.

This central role played by the U.S. capital markets, and the fixed income markets in particular, contrasts with other major economies, where a far greater proportion of consumer and commercial finance is provided by traditional bank lending.

Changes in the capital markets since the financial crisis, be they changes in risk appetites or regulatory approach, have heightened concerns that our capital markets are not providing the necessary funding to our businesses, individuals, and governments in the most efficient way possible. Private credit extended to households and nonfinancial businesses has grown at a slower pace than in all recoveries in the past 60 years.² Small businesses in particular have found it difficult to obtain credit.³ In its recent report on banks and credit unions, the Treasury Department pointed out that real gross domestic product is only 13% higher than in 2007 and lags previous recoveries.⁴

¹ SIFMA is the voice of the U.S. securities industry. We represent the broker-dealers, banks and asset managers whose nearly 1 million employees provide access to the capital markets, raising over \$2.5 trillion for businesses and municipalities in the U.S., serving clients with over \$18.5 trillion in assets and managing more than \$67 trillion in assets for individual and institutional clients including mutual funds and retirement plans. SIFMA, with offices in New York and Washington, D.C., is the U.S. regional member of the Global Financial Markets Association (GFMA). For more information, visit <http://www.sifma.org>

² Zheng Liu & Andrew Tai, Slow Credit Recovery and Excess Returns on Capital (Fed. Reserve Bank of San Francisco Economic Letter 2016-28, Sept. 26, 2016)

³ Fed. Reserve Banks of Atlanta, Boston, Chicago, Cleveland, Dallas, Kansas City, Minneapolis, New York, Philadelphia, Richmond, St. Louis & San Francisco, Small Business Credit Survey (Apr. 2017)

⁴ U.S. Treasury, A Financial System That Creates Economic Opportunities – Banks and Credit Unions (June 2017), at 6 and 44.

As an example, corporate debt markets have seen robust overall issuance but most of this has been in large deals and the number of smaller new debt issues coming to the market has fallen.⁵ Previous SIFMA testimony to this Committee explained that as of a year ago:

- 1) the average size of an investment grade corporate debt transaction approached \$1 billion;
- 2) the number of deals sized above \$2 billion had doubled (since 2010),
- 3) the number of smaller deals had fallen by nearly 50%.⁶

The fact that smaller firms are challenged in effectively financing themselves in the debt market has many potential implications for the economy. Similar difficulties are faced by smaller broker-dealers who play a critical role in the financial markets. Sand has been thrown in the gears of economic growth by regulation such as the Volcker Rule, among other things, and the impact has been disproportionately felt by smaller participants in the market – issuers and market makers alike.

The economy is not functioning as well as it should be at this point in the recovery, and SIFMA believes that policymakers have the ability to improve this situation through tailored recalibration of regulations affecting fixed income markets. This commonsense recalibration could help jumpstart the economy without sacrificing financial stability.

Impact of Post-Crisis Regulation

As SIFMA has frequently stated, we believe that the Volcker Rule as drafted and implemented has impaired beneficial activities (such as permitted market making) and has led many firms to scale back their trading operations as well as their inventories of financial assets. In order to avoid any doubt, firms take a more conservative approach to building inventory or facilitating customer activity than required by the rule. We believe that the Volcker Rule remains a policy prescription in search of a problem and would be better off repealed. However, if it is retained, a more focused approach to definitions of important concepts, such as market making and inventory accumulation, with a review of the compliance regime to better tailor requirements with each firm's business profile would be appropriate.

In addition, while SIFMA supports many of the post-crisis regulatory reform efforts in the area of capital and liquidity and believes that these efforts have enhanced the overall resiliency of the capital markets, now is the time to review how these rules work together—for example by examining how the liquidity requirements work with leverage requirements— with a particular emphasis on determining where they may be impeding liquidity by targeting the same risk in multiple ways. A review should include these liquidity and leverage requirements but also look at the effects of and interactions with CCR, Basel III capital rules, and single counterparty credit limits. We firmly believe this sort of clear review of the potential costs of additional requirements which could limit the capital available for lending against any incremental benefits of resiliency should be undertaken

⁵ See, e.g., “The Two-Speed Economy Still Runs on Two Tracks”, The Clearing House, available: <https://www.theclearinghouse.org/research/banking-perspectives/2017/2017-q1-banking-perspectives/two-speed-economy>

⁶ See testimony of Ronald Kruszewski on behalf of SIFMA, Mar. 29, 2017 (available here: <http://www.sifma.org/issues/item.aspx?id=8589965576>)

with respect to capital and liquidity regulation, and are pleased that policymakers have begun to move in that direction.⁷

At the highest level, SIFMA believes that:

- The U.S. fixed income markets are unparalleled in their size and importance. They are the largest source of financing for America's homeowners, consumers, and businesses.
- Fixed income markets continue to adapt to changes in technology, the regulatory environment, and market participant needs.
- Notwithstanding this adaptation, fixed income markets face challenges in continuing to provide the deep liquidity and capital that consumers, businesses, and investors require.
- In order to ensure the continued depth and diversity of the fixed income markets, policymakers should review the myriad regulatory and prudential actions taken since the crisis with a goal to eliminate overlapping or conflicting regulation, capital requirements, and unnecessary activity restrictions.
- This review should include the Volcker Rule, liquidity requirements, leverage requirements, and other rules and regulations that have impaired market efficiency and capital formation.
- Regulators must move very cautiously when considering new requirements and restrictions on activities and participants in the fixed income markets.

Overview of the U.S. Fixed Income Markets

As of the end of 2016 there were almost \$40 trillion of fixed income securities issued in the U.S. outstanding in the market.⁸ These include U.S. Treasury securities issued by the federal government to finance operations, securities issued by Ginnie Mae, Fannie Mae, and Freddie Mac to provide mortgage financing for homebuyers, bonds issued by corporations to finance capital investment, and bonds issued by state and local governments to build infrastructure, among others. The fixed income markets also provide an important source of income-producing investments for individual and institutional investors. The steady, predictable income generated by most bond investments is where the fixed income markets get their name.

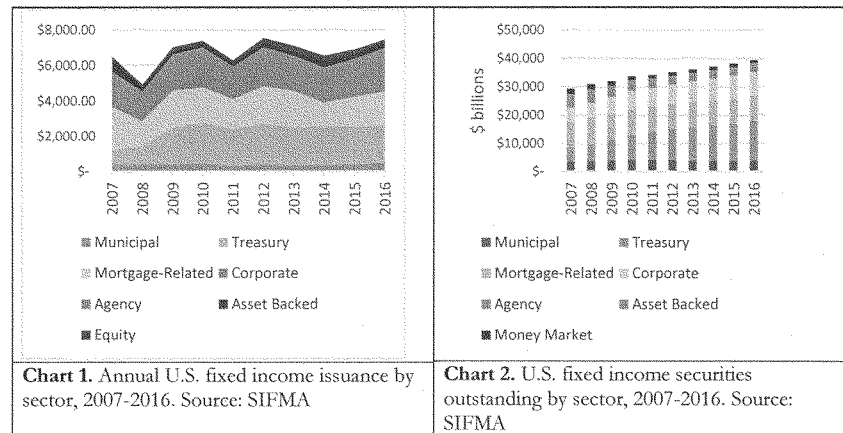
The fixed income markets are generally segmented by sector according to the category of issuer. The Treasury or government securities market includes debt issued by the federal government. The corporate bond market includes debt securities issued by businesses. The mortgage- (MBS) and asset-backed securities (ABS) markets include securities issued to finance home mortgages, car loans, or other types of loans extended to consumers and businesses. Many but not all MBS are issued and/or guaranteed by Ginnie Mae, Fannie Mae and Freddie Mac. Government agency securities are debt securities issued by government agencies, including Fannie Mae, Freddie Mac, Federal Home Loan Banks, the Farm Credit System and others to carry the missions of the agencies. The municipal

⁷ See, e.g., <https://www.treasury.gov/press-center/press-releases/.../A%20Financial%20System.pdf>

⁸ SIFMA, "US Bond Market Issuance and Outstanding" (June 5, 2017), available at: <http://www.sifma.org/uploadedFiles/Research/Statistics/StatisticsFiles/CM-US-Bond-Market-SIFMA.xls?n=33672>, June 5, 2017.

securities market includes bonds issued by state and local governments to finance investment in infrastructure.

Attributable primarily to the low interest rate environment, issuers sold more than \$7.3 trillion of new fixed income securities in the U.S. market in 2016, the third highest year on record. (See Chart 1) This contrasts sharply with the \$197 billion of equity securities issued in the same year.⁹ Issuance in the bond markets occurs practically every day. Companies and governments depend on ready access to capital to respond quickly to business opportunities. For example, it is not unusual for a well known company to issue billions of dollars of fixed securities to finance a new investment with only a few days notice if market conditions are favorable. This kind of ready access to capital promotes growth and is a cornerstone of our economy.

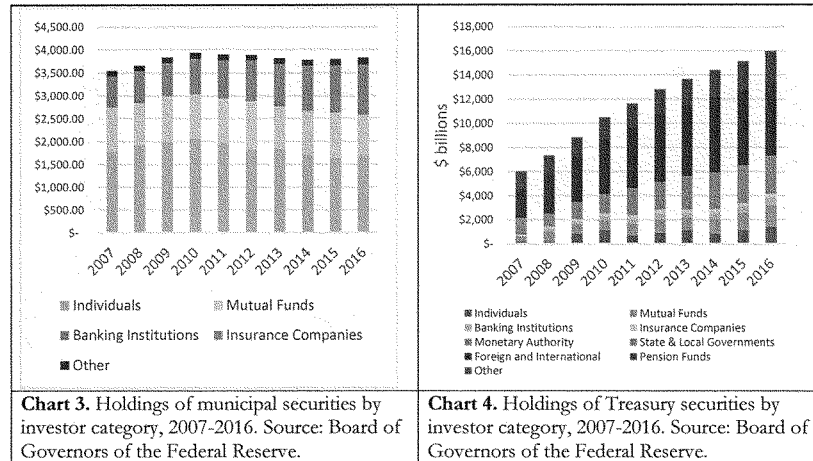


As shown in Chart 2, at the end of 2016 there were \$40 trillion of fixed income securities outstanding in U.S. markets. By comparison, U.S. equity market capitalization at the end of 2016 was approximately \$30 trillion.¹⁰

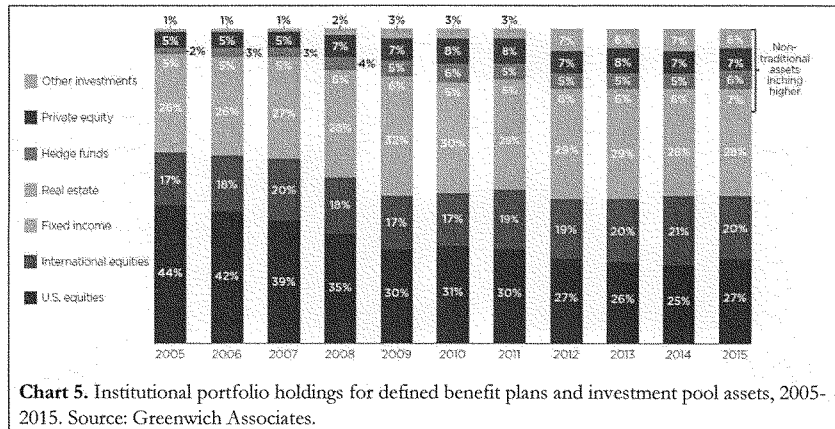
Holdings of fixed income securities vary by sector, but generally include both individual investors and institutions like mutual funds, pension funds, insurance companies and others. Some sectors feature significant participation by individual investors (e.g. municipal securities), whereas others are primarily institutionally based (e.g. Treasuries and securitized products). Data on holdings of the Treasury and municipal bond markets are presented below. (See Charts 3 and 4) These charts show the distinct investor bases of the two markets.

⁹ Source: SIFMA

¹⁰ Source: Nasdaq and NYSE.



In 2015 fixed income investment comprised 28% of institutional investors' portfolios. (See Chart 5 below)



Fixed Income Market Structure Overview

Most fixed income securities have a stated maturity that can range from a week or less to 30 years or more. Investors often buy fixed income investments with a targeted maturity in mind. A life insurance company, for example, may want to match the length of their investments with the timing of claims expected to be paid in the distant future. Families may save for an anticipated future expense like college tuition. However, circumstances change, and sometimes investors may want to exit their fixed income investments before they mature. The “secondary market” exists so that investors who want to sell bonds before they mature can find ready buyers.

The secondary market for fixed income securities differs in important respects from the secondary market for equities. The most important difference is that most fixed income securities trade not on an exchange or national market system but over the counter. While some very small cap companies’ stock also trades over the counter, this accounts for only a tiny portion of all stock transactions. This means that unlike the stock market, where shares are often traded directly between two investors, trading in fixed income securities almost always includes an intermediary, generally a bank or broker-dealer, that buys bonds from one investor and resells them to others.

The over the counter nature of the fixed income market has been its defining structural characteristic and contrasts with the structure of the equity markets. At the end of 2016 there were 5,204 companies whose stock was listed on a U.S. exchange.¹¹ Each company generally has just one class of common stock outstanding, and most listed equities trade actively. Market makers and specialists ensure that there are active, two-way (buy and sell) quotations available for every listed stock throughout the trading day. In the U.S. municipal bond market, by contrast, almost one million individual bonds outstanding have been issued by tens of thousands of states, cities, towns, school districts, authorities and other state and local “political subdivisions.” Each issuer may have hundreds or, for large, active issuers, thousands of individual bonds outstanding. It is simply not possible for dealers to provide active quotes for the approximately one million municipal bonds at all times as most issues do not actively trade. Similarly, there are over one million corporate bonds and mortgage-backed and asset-backed securities outstanding. The vast majority of fixed income securities do not trade every day. Many bonds go months or even years without trading at all. Indeed, in some cases an investor may buy a bond when it is newly issued and never trade the bond at all before it matures.

That is not to say, however, that the fixed income markets are illiquid. When investor wants to sell a bond, it should be possible to get executable price quotes from one or several dealers on request. Dealers buy bonds directly from customers and keep them in their inventory while they search for a buyer, either an investor or another dealer. In addition, underwriters of fixed income securities typically make markets in securities that they underwrite. While the dealer owns the bond in its inventory, the firm is exposed to the risk that the price of the bond will fall before the dealer finds a buyer. While many dealers use products and strategies to hedge that risk, hedging comes with costs, and hedges are not always perfect. In addition, under banking and securities rules, firms must commit capital against trading positions to provide a “cushion” against any losses. In any case,

¹¹ Source: World Federation of Exchanges

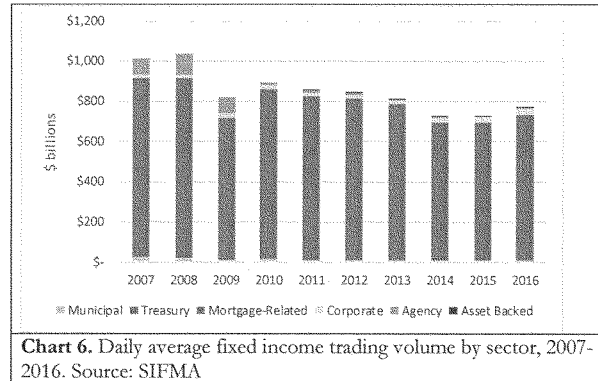
liquidity in the fixed income markets generally depends on the ability and willingness of dealers to commit capital and take on risk in order to buy bonds from customers who want to sell.

Another difference between equity and fixed income trading is how dealers are compensated. In the stock market, many trades are brokered. Dealers match buyers and sellers of securities but usually do not take shares into inventory or take on any market risk and earn commissions for executing trades for customers. In the fixed income markets, by contrast, dealers rarely earn commissions for secondary market transactions. Instead, a dealer buys a bond from a customer at one price, the “bid,” and resells the bond at a slightly higher price, the “offer” or “ask.” In simplistic terms, this difference between the bid and ask prices, known as the “markup,” is a reference point for the dealer’s compensation for executing the transactions and taking the market risk associated with the position. Conversely, for the customer selling their bond to a dealer, the dealer’s compensation is known as a “markdown.” The difference between the bid and ask prices, the “bid-ask spread,” can also be an indication of market liquidity. The more liquid the instrument and the less risk the dealer takes on, the smaller the bid-ask spread.

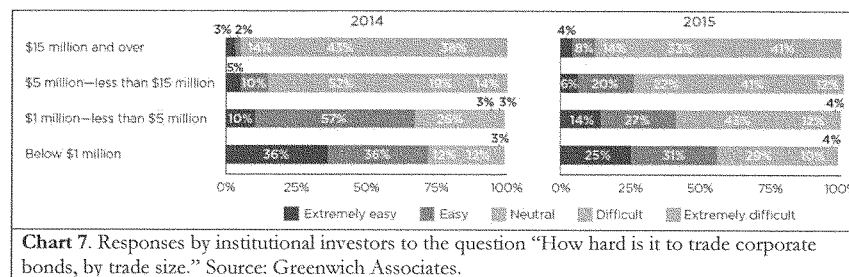
The best example over an active and deep fixed income market is the “on-the-run” market for Treasury securities. On-the-run Treasuries are the most recently issued of the various securities the Treasury Department sells regularly (4-, 13-, 26- and 52-week bills, 2-, 3-, 5-, 7-, and 10-year notes, 2-year floating rate notes, 30-year bonds, and 5-, 10-, and 30-year Treasury Inflation Protected Securities, or TIPS). The market for on-the-run Treasuries is very large and active and is dominated by large institutional investors, investment funds, banks and others. Around 2/3 of all fixed income trading volume in the U.S. is in the Treasury market, and the vast majority of that activity is in on-the-run issues. The on-the-run Treasury market is the most active and liquid securities market in the world. Bid-ask spreads for round-lot institutional trades are near zero, meaning there is virtually no cost to transacting on-the-run securities. Also, because this segment of the market is so liquid and active, alternative forms of electronic trading have evolved that allow investors to trade directly with each other without dealer intermediation.

Market Liquidity

One way to define liquidity is in relation to the ability to execute a large secondary market transaction at a reasonable cost and without significantly affecting the price of the security. Indications of liquidity can be measured by various indicators, including trading volume, bid-ask spread, dealer inventories and other measures. However, the ultimate measure of liquidity is in part subjective and depends on market participants’ perceptions of the ease and cost of executing institutional size trades.



In 2014 and 2015 surveys of corporate bond investors, Greenwich Associates asked about the ease of trading corporate bonds by size.¹² In each year of the survey, over 75% of investors found it “difficult” or “extremely difficult” to trade larger-size blocks of corporate bonds. (See Chart 7 below.) by trade size.” Source: Greenwich Associates.



A number of factors affect market liquidity, and market liquidity can improve or deteriorate depending on these factors. These include, among others:

- **Regulation.** Regulation of dealer activity can affect liquidity. For example, the Volcker Rule limits on trading by banks in some cases constrain dealers’ ability to take on trading positions and build inventory necessary for market making. Capital and leverage rules also limit dealers’ ability to finance positions held in inventory, and can clearly limit their ability to commit to customer trades.
- **Monetary policy.** In the wake of the financial crisis and the 2008-2009 recession, the Federal Reserve undertook an aggressive policy of “quantitative easing” whereby it purchased

¹² Greenwich Associates, “Understanding the US Fixed Income Markets” Oct. 2016, at 9.

significant volumes of Treasury securities and Agency MBS. One goal of this effort was to reduce yields in the markets for the securities that are purchased and drive investment from these safe haven markets into other markets, such as corporates, through the so-called portfolio balance channel. Importantly, the Federal Reserve is a buy-and-hold investor, so bonds it purchases are effectively removed from tradeable float. Accordingly, from a whole-market perspective impacts on liquidity of these operations are mixed – in some markets (e.g., TBA MBS where Federal Reserve ownership approached one-third of available securities the market), Federal Reserve activity would crowd out other investment and have the effect of reducing liquidity for participants, while it would simultaneously increase demand and liquidity in other markets as investors shift their activity to them.

- Market activity. When many investors attempt to sell bonds in the secondary market at the same time, liquidity usually suffers. Dealers have a limited balance sheet capacity to absorb customer requests to sell bonds, and when significant trade flow imbalances arise, dealers may be constrained in their ability to provide liquidity to the market. Since liquidity in most sectors depends heavily on dealers committing capital and taking risk positions, dealers withdrawing from the market necessarily dampens liquidity. This affect may be exacerbated in a market where prices are declining, since neither dealers nor investors want to be exposed to market risk under those conditions.
- Dealer risk management. While regulations and capital requirements can dramatically affect liquidity, non-regulatory changes in dealer behavior can also affect liquidity. Since the financial crisis many dealers have reduced the sizes of their balance sheets and, as a matter of prudent risk management, limited their own exposure to market risk, which can limit their ability to absorb customer positions.

Fixed Income Market Regulation

The U.S. fixed income markets are strongly regulated with ten federal agencies and self-regulatory organizations involved in rulemaking or enforcement regarding fixed income securities and related products. SIFMA believes that a wave of new laws and regulations implemented after the financial crisis, that were designed to address financial stability concerns and not targeted directly at fixed income markets, have nonetheless constrained dealers' ability to provide liquidity. These include, among others: CCAR, Basel III capital rules, leverage ratio, liquidity coverage ratio, single counterparty credit limits and the Volcker rule. We have not yet seen how the combined effects of these regulations will affect fixed income liquidity in a truly stressed market environment but many market commentators and policymakers have expressed concerns. As mentioned above, we believe the time is right for a review of the effects of these rules and requirements.

What follows is a brief outline of how fixed income markets are regulated.

- All broker dealers who participate in the fixed income markets are required to be registered with the U.S. Securities and Exchange Commission (SEC) and one or more self-regulatory organizations (SROs) such as the Financial Industry Regulatory Authority (FINRA) or the Municipal Securities Rulemaking Board (MSRB). The SEC also oversees mutual fund

companies and registered investment advisors and Automated Trading Systems (ATSs). The SEC and FINRA also regularly examine bond dealers to check for regulatory compliance.

- Bank regulators, including the Federal Reserve Board (the “Fed”), the Office of the Comptroller of the Currency (OCC) and the Federal Deposit Insurance Corporation (FDIC) make rules that impact bank and bank holding company participation in the markets, including areas such as capital and liquidity.
- The U.S. Treasury Department is the primary rule maker with regard to the market for U.S. government securities.
- The Commodity Futures Trading Commission and the National Futures Association oversee the markets for fixed income derivatives.
- The Federal Reserve Bank of New York exercises oversight of the primary dealers.
- Finally, the Department of Labor oversees entities that manage investments that fall under the Employee Retirement Income Security Act of 1974 (ERISA).

In the area of investor protection, U.S. regulators have several areas of focus. FINRA and the MSRB have rules in place that require dealers to have a “reasonable basis to believe” that investments they recommend to customers are suitable. In addition, dealers are required to provide investor customers with prospectuses, official statements or other key disclosure information at the time they recommend an investment. FINRA and the MSRB also have rules in place to help ensure that investors pay or receive fair prices for the securities they buy or sell and rules that require dealers to report relevant information about an investment to a customer at the time of a transaction, as well as certain best execution obligations. The SEC oversees mutual fund companies and registered investment advisors to ensure that investors receive clear information about investments in their funds and that asset managers adhere to a fiduciary duty with regard to customers’ investments.

The SEC has a panoply of disclosure rules in place that (among other things) require an issuer of registered securities to produce a prospectus at the time that bonds are offered for sale. SEC rules also require corporate securities issuers to publish annual, audited financial statements, quarterly financial statements and notices of certain events that could affect the value of their securities.

Securities are also issued in non-registered forms, most notably in the so-called Rule 144A market. While these securities are not registered with the SEC, and not necessarily subject to disclosure rules applicable to registered offerings, they remain subject to the SEC’s anti-fraud regulations such as rule 10b-5 and other requirements that provide investor protections. SIFMA members believe that, in some sectors, burdensome and unnecessary increases in registration requirements have increased risk to issuers and underwriters, driving issuance into the unregistered markets (e.g., private-label MBS).

Disclosure rules in the municipal bond market do not apply directly to issuers. However, the SEC has rules in place designed to help ensure that both at the time of issuance and on an ongoing basis, investors have ready access to issuer financial and risk information. Financial information from corporate issuers is available to investors free on the SEC’s EDGAR platform, and municipal bond information is available on the MSRB’s EMMV platform.

In the area of price transparency, both FINRA and the MSRB have rules in place that require dealers to report the prices of most agency, corporate, mortgage- and asset-backed, and municipal bond

transactions to a central repository. This trade information is publicly disseminated for most of these markets through FINRA's TRACE system and the MSRB's EMMA platform, in real-time in the case of agency, corporate and municipal securities.

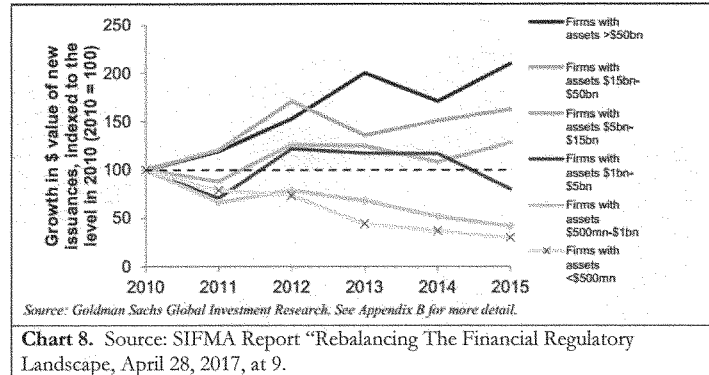
Prudential regulation is mostly the purview of the SEC (for broker-dealers) and the federal banking agencies, the Fed, the OCC and the FDIC (for banks). These agencies have in place rules that require broker-dealers and banks to hold minimum levels of capital against the investments they hold, providing a "cushion" against losses the bank may suffer if positions they hold perform poorly. The bank regulators' "risk-based" capital rules account for the relative risks of various categories of investments, and in general require banks to hold more capital against riskier positions. Banking agencies also have rules in place to limit leverage and to help ensure that banks have sufficient liquid investments that they can sell quickly if the need arises. In addition, the "Volcker Rule," a provision of the Dodd-Frank Act, prohibits banks from engaging in "proprietary trading" of many categories of investments, including certain fixed income securities.

Corporate Bond Market Overview

The corporate bond market provides the means for businesses to raise capital to finance investment in new capital assets. The primary market is active and in recent years and has experienced significant growth given the interest rate and economic climate with both a rise in annual issuance (together with a rise in the average deal size) and a commensurate rise in the dollar volume of bonds outstanding. For example, investment grade corporate bond issuance in grew from \$1,032 billion in 2012 to \$1,286 billion in 2016 (a 24.6% increase) while the size of the overall corporate bond market or dollar volume of bonds outstanding was approximately \$8.5 trillion in 2016, a 21% increase since 2012 (i.e. \$7 trillion). In 2016 average daily trading volume in U.S. corporate bonds was \$30.0 billion. By comparison, average daily stock market trading volume in 2016 was \$273 billion. Looking at trading in relation to the size of the market, in 2016 average daily corporate bond trading volume represented 0.35% of total volume outstanding at the end of the year. In the equity market, trading volume represented 0.94% of end-of-year market capitalization.¹³

As discussed in the introduction, access to the market for smaller issuers has declined in recent years, as growth (or decline) in issuance is clearly correlated to issuer size. (See Chart 8)

¹³ Derived from SIFMA statistics, available at <http://www.sifma.org/research/statistics.aspx>



Secondary market trading volume in most fixed income markets is unsurprisingly dominated by trading in newly issued securities. Corporate bonds tend to trade very actively in the weeks immediately following a new issuance and trading activity wanes considerably as bonds come to rest with more buy-and-hold investors. Similar to the municipal securities market, it is not uncommon for individual bonds to trade very infrequently in the secondary markets which can make price discovery more challenging.

Market structure for corporate bonds, which had historically relied heavily on dealer intermediation over the phone, has been evolving in recent years to adapt to a host of regulatory and market forces. Importantly, there has been significant competition and innovation in electronic trading platforms and increased investment in data aggregation and client connectivity among market participants. There are now likely to be upwards of 20 operational electronic platforms serving the corporate bond space compared to only a handful in 2010¹⁴ and the electronic trading of investment grade corporate bonds has grown from approximately 8% in 2013 to 20% in 2015¹⁵. A number of new electronic trading platforms have functionality that allows any market participants, dealers or investors, to trade directly with each other. While adoption of electronic trading has been incremental, the growth in electronic trading platforms for corporate bonds will most certainly change the way many corporate bonds trade over time even with some or even significant continued reliance on dealer intermediation. Electronic trading has been dominant in retail-size transactions, but institutional market participants have [begun] increased their use of new trading mechanisms as well, albeit slowly. The market share of the top 10 dealers in what FINRA categorizes as “more active” corporate bonds is 69%, while the same measure is 56% in what they classify as “less active” corporate bonds.¹⁶

¹⁴ SIFMA, 2016 Electronic Bond Trading Report, (Feb 2016), available at: <http://www.sifma.org/issues/item.aspx?id=8589958906>

¹⁵ Greenwich Associates, “The Continuing Corporate Bond Evolution”, (Q4 2015). Please note that Greenwich Associates interviewed 1,063 US Institutional Investor active in Fixed Income between February and April 2015 to gather the information on Corporate Bond electronic trading.

¹⁶ FINRA, Analysis of Securitized Asset Liquidity, (June 2017), at 14.

There has been also been an increasing focus among corporate bond market participants on better data capture and more efficient use of trade data to aid in price discovery and in finding ready buyers, and a marked increase in the availability and utilization of pricing systems in that regard to both price bonds and measure best execution.

New market regulations, especially the Volcker Rule and rules governing capital and liquidity, have affected dealers' willingness to make markets and readily commit capital in corporate bonds. Unsurprisingly, the New York Federal Reserve Bank's Liberty Street Economics team recently summarized a separately published study that found that institutions more affected by post-crisis regulation are less able to intermediate customer trades.¹⁷ Compressed bid-ask spreads are often cited as evidence of continued strong liquidity and an efficient market. However, liquidity can be measured in a number of ways and one metric won't give an accurate picture of the health of the marketplace as a whole. As the Greenwich Associates survey result shown in Chart 7 suggests, a significant percentage of survey participants believe larger trade sizes are difficult to execute. A 2015 FINRA Analysis on Corporate Bond Liquidity also indicated there is evidence that finding liquidity is now associated with smaller trade sizes, more transactions and larger dealer networks and while the absolute number of block trades continues to increase, the proportion of block trades to total volume is also falling as is the average trade size.¹⁸ Importantly, these reference points may reflect a market in transition where liquidity is more dynamic and where market participants are trying to adapt.

Corporate Bond Market Policy Questions

New market regulations, especially the Volcker Rule and rules governing capital and liquidity, have affected dealers' willingness to make markets and readily commit capital.

Recently published data shows that the Volcker Rule has impacted firms' ability to make markets and provide market liquidity—particularly in times of stress. A recent Federal Reserve staff paper concluded that “the Volcker Rule has a deleterious effect on corporate bond liquidity and dealers subject to the Rule become less willing to provide liquidity during stress times.”

This adverse impact on market liquidity will cause the greatest problems in times of stress. During times of stress, financial institutions will be disincentivized from providing liquidity, precisely when it is most needed, if trading in a stressed environment subjects them to regulatory risk and potential second-guessing resulting from the unclear and complex standards of the current Volcker Rule.

Also of relevance to this discussion is the recent FINRA proposal to modify Rules 2241 and 2242 governing investment research.¹⁹ FINRA's proposal would to create a limited safe harbor for specified brief, written analysis distributed to eligible institutional investors that comes from sales

¹⁷ New York Fed's Liberty Street Economics blog published on the Capital Markets page: Dealer Balance Sheets and Corporate Bond Liquidity Provision, (May 2017), available at <http://libertystreeteconomics.newyorkfed.org/2017/05/dealer-balance-sheets-and-corporate-bond-liquidity-provision.html>

¹⁸ FINRA published an Analysis on Corporate Bond Liquidity, available at: https://www.finra.org/sites/default/files/OCE_researchnote_liquidity_2015_12.pdf

¹⁹ FINRA Regulatory Notice 17-16, “Desk Commentary Safe Harbor,” April 2017.

and trading or principal trading personnel but that may rise to the level of a research report, known as “desk commentary”. The proposed safe harbor would be subject to conditions, including compliance with a number of the Rule 2241 or Rule 2242 provisions to mitigate research-related conflicts. In addition, the proposed safe harbor would require firms to include a “health warning” on desk commentary and to obtain negative consent from eligible institutional investors to receive such commentary.

In our response to the FINRA proposal we argued that that certain “conflict management” provisions relating to investment banking should be eliminated and modified because these provisions, as currently contemplated, would preclude sales and trading personnel who author eligible desk commentary from engaging in many ordinary course activities.²⁰ These restrictions may be particularly onerous for smaller firms that have limited resources and are less likely to have dedicated investment banking personnel with certain structuring expertise that exists in sales and trading.

While we provided substantive and constructive comments to the proposal, we are not aware of any substantial investor concerns that have arisen from historical or existing desk commentary content or perceived conflicts of interest to warrant the proposal and we remain concerned that valuable communication tools could be unnecessarily stifled to the detriment of the marketplace. We believe that most desk commentary does not risk technically being considered a research report. From our perspective, most desk commentary lacks analysis and to the extent desk commentary contains analysis, it would not be sufficient to make an investment decision.

Finally, FINRA recently issued a request for comment as part of its FINRA360 initiative intended to streamline FINRA’s rules that affect the access to capital among securities issuers.²¹ In our response²² we argued, based on our member firms’ experience, that FINRA’s debt research rule has eroded the frequency and quality of interactions between debt research and trading desk personnel, putting both at a significant information disadvantage. Given the relative complexity of the debt market and the breadth of debt security classes, debt research analysts need access to current market information from traders, and traders need research analyst input to accurately price positions for clients and manage firm risk.

This issue is particularly acute when significant news stories or corporate events are announced, and the absence of guidance from an analyst can prejudice a trader’s ability to price debt securities in real time. Additionally, the absence of this information negatively affects investors’ ability to make informed decisions on debt securities in their portfolios, constraining market liquidity in less liquid securities or during times of market stress.

Although FINRA permits certain interactions between research and trading, the boundary of permitted and prohibited interactions is confusing and does not go far enough to give firms comfort that certain communications are appropriate, thus discouraging debt analysts from engaging

²⁰ Letter from Sean Davy, SIFMA, to Jennifer Piorko Mitchell, FINRA, on Desk Commentary Safe Harbor from FINRA Equity and Debt Research Rules, May 31, 2017.

²¹ FINRA, Regulatory Notice 17-14, “Capital Formation” (April 2017).

²² Letter from Sean Davy, SIFMA, to Jennifer Piorko Mitchell, FINRA, on Request for Comment on FINRA Rules Impacting Capital Formation (June 6, 2017).

in even permissible interactions. FINRA should revise the rule or otherwise issue guidance to provide both clarity and greater flexibility to the interactions between research and trading to avoid these unnecessary impediments.

Treasury Market Overview

The importance of the U.S. Treasury market to the national—indeed, the global—economy cannot be overstated.²³ This market is unique and provides key functions that underlie financial markets throughout the world.

The U.S. Treasury market, the largest segment of the fixed income market, continues to function well in its role providing the benchmark risk-free rate for the global economy. This unique, resilient, and robust market serves multiple roles including as the transmission mechanism for monetary policy, as a safe-haven investment particularly during times of financial stress, and, most importantly, as the source of stable and efficient and low-cost funding for the Federal government. Treasury securities also underpin the new prudential regulatory framework for liquidity of U.S. and many other global financial institutions that has made our financial system significantly more resilient. Recent reviews of the changes in this market have noted the participation of new types of participants and a significant move to electronic dealing.

Given the importance of this market, continued study and review of these changes is necessary to ensure that the Treasury market remains the efficient centerpiece of the economic framework. Any changes to regulation should be carefully calibrated to support both the resiliency and the role of the Treasury market and recognize the unique structure and auction process that has allowed the Treasury to finance government activity at a low cost to taxpayers. We note recent market improvements, most notably the collection, set to begin in July 2017, of secondary market transaction data for use by Treasury and the regulators and supervisors. Additional changes, including public dissemination of secondary market transaction data, need further careful study to ensure that no harm comes to this market.

Treasury's ability to borrow to finance the federal government's debt is built around a truly unique, principal-based market structure, one that is not easily (or appropriately) comparable with more traditional agency (e.g., equities) markets. The fundamental starting point of this market rests in the Treasury auction process.

Treasury has structured the auction process to minimize government costs by promoting broad, competitive bidding. Primary dealers—banks and broker-dealers that have been approved to trade in U.S. Treasuries with the Federal Reserve Bank of New York (New York Fed)—have traditionally constituted the largest group of buyers in such auctions (bidding on behalf of their own accounts or

²³ Our description of the Treasury market is drawn from the SIFMA/ABA letter, dated April 22, 2016, in response to the Treasury's 2015 Request for Information. The letter is available at <http://www.sifma.org/comment-letters/2016/sifma-submits-comments-to-the-treasury-in-response-to-rfi/>. For a comprehensive description of the market and market participants, see "Emerging Issues in the Functioning of the US Treasury Market," April 22, 2016, published by Promontory Financial Group and available at <http://www.promontory.com/Articles/Insights/4/22/16.../Emerging-Issues-in-the-Functioning-of-the-US-Treasury-Market/?terms=treasury%20market>.

on behalf of identified customers).²⁴ Other direct auction bidders include investment funds, pensions and retirement funds, insurance companies, foreign accounts and others. Primary dealers are, however, the only market participants who are obligated to participate in all auctions of U.S. government debt, with all bids to be made (at a minimum), for an amount of securities representing their pro rata share of the offered amount.

The New York Fed further expects primary dealers to act as “responsible counterparties and market participants in their overall conduct and support of market efficiency and liquidity.” The obligation to support market liquidity extends not only to on-the-run securities, but also to a host of less liquid off-the-run securities. In meeting those obligations set forth by the New York Fed, and in attempting to satisfy market and client demands, primary dealers are frequently required to commit capital in significant size. Principal trading activity in the “when-issued” market, during auctions, in the aftermarket of auctions, and in the secondary market (including with respect to off-the-run securities) correspondingly requires these dealers to hedge their positions with other treasury products (both in the specific security and other related securities) on a confidential basis. The ability of primary dealers to do so is critical to the overall functioning of the U.S. Treasury market and to helping maintain appropriate levels of liquidity in this market.

Other market participants are not similarly bound by the market-making obligations that put primary dealers in a position of providing both buy and sell quotes on a more-or-less continuous basis. Corporate hedgers and hedge funds, for example, seek to hedge specific business risks but do not serve clients as in a typical broker-dealer business model, and are generally liquidity takers, rather than liquidity providers. Principal trading firms (PTFs) similarly do not serve clients, but play a more pronounced role in providing liquidity, trading for their own accounts and in volume to maximize profit on all trades, for which very limited capital is committed. Asset managers, by contrast, serve investors and clients as fiduciaries, on a low-leverage, long term investment basis, and while they have the capacity to provide liquidity, their primary obligation is to serve their clients and investors, making them predominantly liquidity takers. At the same time, each of these non-primary dealer market participants contributes in unique and important ways to the liquidity profile of the U.S. Treasury market.

A wide range of market participants—including bank portfolio and asset managers, fixed income and swaps dealers, bond underwriters, and mortgage bankers and servicers—rely on Treasury securities to actively assume interest-rate risk or to manage the rate risk inherent in their business activities. Each of these participants will have a unique risk profile—by term and duration, scale, and variability. Collectively, they rely on the availability of Treasury securities across an extensive term structure for their investment and hedging needs.

The characteristics of the market also vary significantly across product segments, particularly with respect to the on-the-run and off-the-run segments, with the on-the-runs trading much more frequently and electronically (i.e., typically on many-to-many platforms in both the cash and futures markets).

²⁴ The New York Fed currently recognizes 23 primary dealers. The primary dealers list is available at <https://www.newyorkfed.org/markets/primarydealers>.

Significant differences among market participants may also be seen in their business models, functions, trading practices and strategies. Some factors and forces that have been reshaping the Treasury market have enhanced liquidity and stability, and others have had more negative effects. In addition, the suggestion by some that cash Treasuries trading activity may be shifting toward the futures market, or other markets, increases the importance of understanding the reasons for these changes, and how an appropriate regulatory response could enhance market operations while facilitating greater liquidity.

Treasury Market Policy Questions

Official sector data repository

SIFMA fully supports increasing official sector (*i.e.*, market and prudential regulators) access to data related to U.S. Treasury market transactions. We strongly believe that the official sector must have access to the data necessary to carry out its various regulatory functions, to develop a more comprehensive understanding of U.S. Treasury market activity and to improve Treasury's ability to oversee market liquidity, resiliency and efficiency. SIFMA has been working with its members as they prepare to begin reporting secondary market Treasury transactions to FINRA through the TRACE reporting engine. We believe once fully implemented this will materially increase the official sector's ability to fulfill its market surveillance duties. To enhance the data available to regulators, consideration should be given to including market participants who are not currently subject to TRACE reporting requirements.

Public dissemination of Treasury transaction data

With respect to further public dissemination of Treasury secondary market activity, SIFMA's feedback from members indicates that there is an abundance of publicly available information sufficient to allow market participants to obtain information needed to trade in a competitive, fair and efficient manner. Indeed, the unique nature of the Treasury market and the Treasury auction process, with the need for primary dealers to be able to hedge their positions on a confidential basis, counsels extreme caution in moving forward with additional public disclosure.

For the most liquid segment, on-the-run securities, executions and a range of other data are observable by monitoring information available from the primary execution venues for these products. Specifically, we believe there is considerable price transparency in the on-the-run market through trading platforms such as BrokerTec and NASDAQ Fixed Income (previously known as eSpeed) and the futures markets, where indicative bids and offers are available and executable, and, for customers, through direct access to dealer franchises. With respect to less liquid products (*e.g.*, off-the-run securities), indicative pricing and other market data are available from Tradeweb and Bloomberg, and customers also have multiple options for direct access to dealer franchises that can also provide indicative bids for less liquid products.

We do not believe that increased reporting of Treasury transactions to the public would have any net positive effect on improving market functionality or liquidity. Specifically, we believe that there are significant identifiable and predictable risks to market diversity, liquidity and resiliency that arise

from the prospect of mandatory increased public disclosures that outweigh any potential—as yet unidentified—benefits. Two aspects should be considered in this context: (i) large positions/client accommodation, and (ii) primary dealers' ability to hedge.

We believe that a range of market participants would be inhibited in their investing activity if they deemed the detail and frequency of public data dissemination too high, particularly for the off-the-run market and large trades across market segments (which also require time to hedge). Parts of the Treasury market are very concentrated and transactions occur in large sizes.²⁵ Third-party investors, particularly those providing the principal-based liquidity that is so critical to this market, have a legitimate and well-established interest in maintaining the confidentiality to be able to trade without concern that too much public information will hurt bilateral price formation.

Similarly, the ability of primary dealers to hedge their positions around Treasury market auctions and in meeting counterparty demand in the secondary market, which is critical for such market participants to continue serving as principal-based liquidity providers for a diverse investor base, would be compromised if they were unable to do so on a confidential basis. Without this ability, it would be materially more difficult for primary dealers to commit significant amounts of capital to satisfy market and client demands, and to meet their obligations set forth by the New York Fed. Given the importance of primary dealers' role in the auction process, and for maintaining liquidity in the market, SIFMA believes that the prospect of losing confidentiality for these market participants would have serious consequences for their critical role and the market more broadly.

Mandatory Central Clearing

Additionally, SIFMA supports the further investigation and study, to be led by Treasury, of the potential costs and benefits of implementing a mandatory central clearing requirement for the cash Treasury market, and we believe this study should consider all potential forms of a clearing requirement that could be implemented across the cash Treasuries product ecosystem (*i.e.*, on and off-the run issues, the when-issued market, repos, etc.). We also support further study and evaluation of the costs and benefits of mandatory centralized repo clearing.

Capital and Liquidity

As noted above, liquidity and capital requirements have had a material impact on banks' traditional role as primary dealers and their associated market-making function in the Treasury market and their willingness and ability to hold inventory. Specifically, SIFMA believes that the measurable reduction in primary dealer inventory and market-making capacity that is potentially affecting Treasury market liquidity can be tied, at least in part, to banks' responses to the implementation of new prudential regulations. The new rules increase the amount and quality of capital that banks have to hold and introduce a minimum leverage ratio requirement designed to limit excessive

²⁵ See Joint Staff Report at 52.

leverage in the banking sector.²⁶ We are supportive of the capital and liquidity regulations that have been put in place since the crisis to improve the safety and soundness of banking institutions. We are concerned, however, that the resulting reduction in primary dealer inventory and market-making capacity being driven by what is, in some cases, non-harmonized capital rules that target the same risk numerous times, may be hampering the ability of other market participants to execute trades, particularly in stressed environments. This is because as the mandate of the franchise business is narrowed by external regulatory requirements, the ability to service customers is constricted.

The requirement for bank-affiliated primary dealers to hold High Quality Liquid Assets (HQLA) illustrates our concern. As banks, such primary dealers are required to hold a buffer of HQLA, *e.g.*, Treasuries, to meet the requirements of the Liquidity Coverage Ratio (LCR) rules. The increased demand for HQLA has decreased their supply (and has decreased the level of inventory that may otherwise be available). Relatedly, higher capital charges on banks for low yielding assets have increased the banks' need to hold higher yielding collateral and decreased their ability to act as dealer or market makers in low yielding assets such as Treasuries. At the same time, the cost of financing capital has increased. Banks traditionally use repo markets to finance trading and market-making activity. Because repos were traditionally assigned low risk weights, since they are normally fully collateralized with high quality collateral, banks only needed to allocate limited capital to repo positions. However, banks now face higher capital charges to account for counterparty credit risk from repo exposures.²⁷

As the capital constraints on banking institutions continue to increase due to recent proposed changes to capital and leverage ratio calculations, banks' willingness to engage in such low margin businesses will likely come under increased pressure and their ability to step in and support the market during times of stress will be challenged. The liquidity being provided by PTFs has filled the liquidity void under normal market conditions to some extent, but market depth has become more fleeting in general. Moreover, less diversity in liquidity providers leads to less resiliency, particularly during stress periods.

We believe that a review of the coherence of the current regulatory regime is timely and should include, among other assessments, an evaluation of several issues, including, for example, how the Treasury market is impacted by the LCR. As described above, under the LCR, banks are on one hand forced to hold HQLA, such as Treasuries, and on the other hand they are forced to hold more capital as a result of holding these very same assets. We urge a review and assessment of these concerns by examining duplicative and overly burdensome capital and liquidity regulations on market participants, and determining whether they are having the unintended effect of reducing or weakening market liquidity.

²⁶ PricewaterhouseCoopers LLP, "Global Financial Markets Liquidity Study (Aug. 2015) (GFMA Study) at 36, available at <http://www.pwc.se/sv/pdf-reports/global-financial-markets-liquidity-study.pdf>.

²⁷ *Id.* at 39.

Municipal Securities Market Overview

Municipal securities are issued by state and local governments to finance investment in schools, roads, airports, water and sewer systems, and all manner of infrastructure. Approximately 75% of the nation's infrastructure is financed, built and maintained by states and localities, and nearly all of that was financed with municipal bonds.

Municipal securities are unique in several respects. First, unlike stocks and corporate bonds, municipal securities are exempt from registration from the SEC, meaning that municipal bond issuers are not directly required to produce prospectuses for new bond issues or file them with the SEC. Instead, SEC rules require dealers to obtain and distribute official statements (OSs), which are similar to prospectuses in some respects but do not require SEC approval. Also, municipal issuers must produce a new OS for each new bond deal—there is no concept of “shelf registration” in the municipal market. Continuing disclosure for municipal issuers—rules governing the dissemination of disclosure information after bonds have been issued—is also quite different in the municipal market. As the SEC does not have statutory authority to regulate municipal issuer disclosure directly, the disclosure rules in the municipal market are implemented through dealers.

Second, the interest on most municipal securities is exempt from federal and, in many cases, state and local income taxation. This feature significantly reduces borrowing costs for state and local government. However, the tax-exempt nature of municipal interest effectively prevents market participants from “shorting” municipal securities, which is a common hedging strategy across the capital markets. Hedging positions in municipal securities must be accomplished by shorting Treasury securities or using derivative products that are tied to non-municipal securities, like Treasury futures contracts. However, because these hedges may not mirror the underlying long position in the bonds, the hedges are inefficient and may not offer much protection against market losses. The tax-exemption for municipal bond interest, while important for reducing state and local borrowing costs, effectively makes the municipal market a long only market by preventing shorts. This in turn negatively affects market liquidity since dealers often cannot perfectly hedge trading positions.

The use of electronic trading platforms as a price discovery tool²⁸ has become more prevalent in recent years. Two platforms in particular have established significant footholds in the market, TMC Bonds and Tradeweb Direct. TMC Bonds provides a means for dealers to post executable offerings of bond positions. Buyers can execute trades directly on screen. Participants can see full depth of market with visibility of prices, yields, spreads and sizes of all orders. Users can search and execute orders by CUSIP, direction, price, yield, spread and size with an option to define minimums, increments, and minimum balance remaining. All orders are live and executable. Tradeweb Direct offers a means for users to solicit bids for bonds they may want to sell. The platform supports both dealer-to-dealer and dealer-to-investor (mid-size institutional users). Dealers often use the platform to solicit quotes for their retail customers. A number of other platforms, including electronic interfaces operated by traditional voice brokers' brokers, also offer the ability to discover prices and

²⁸ The MSRB has warned selling dealers that they should not use the bid wanted process for price discovery if they have no intent to sell the bonds, as it harms the integrity of the bid-wanted and offering processes.

execute trades in municipal securities, and the use of electronic trading in the municipal market is likely to grow in the future.

Municipal Securities Market Policy Questions

Several actions by regulators in recent years have threatened to hamper municipal and corporate bond market liquidity. In 2012, the SEC published a comprehensive report on municipal securities market structure and regulation.²⁹ In the report, which was unanimously endorsed by all SEC commissioners at the time, the SEC discusses two general areas of focus, municipal disclosure regulation and municipal market structure. SEC Chair White accelerated the push for an examination of both the corporate and municipal bond market structure in 2014 with focus on markup disclosure, best execution and increased pre-trade transparency.³⁰ The best execution rules have been implemented, the markup disclosure rules are pending implementation, and consideration of pre-trade transparency requirements continues.

Markup Disclosure

Dealers are in favor of disclosure of relevant transaction data to retail investors, as such transparency supports investor trust and confidence in the markets. However, although the markup rule will not take full effect until May 2018, it is already raising concerns among market participants as firms develop the systems needed to implement the new rule. The MSRB and FINRA rule changes will require dealers to begin disclosing the amount of markup and markdown they earn on same-day trades where at least one leg of the trade involves a retail customer. In other words, if a dealer buys a bond from a customer and resells the same bond to another customer on the same day and at least one of those investors is an individual, then beginning in May 2018, the firm must begin reporting the amount of markup/markdown to the retail customer.

Markup and markdown are defined as the difference between the price charged to the customer and the interdealer price for the bond at the time of the customer trade. Determining the markup is easy when a dealer buys and sells a bond simultaneously, sometimes called a “riskless principal” transaction. The markup is simply the difference between the price the dealer bought the bond from another dealer and the price the dealer sold the bond to the customer. However, if some hours have passed between the dealer’s purchase and sale, market prices may have moved. The rules in these cases will require the dealer to calculate the markup based not on their acquisition price but on the “prevailing market price” at the time the dealer sells the position.

Because the vast majority of municipal and corporate bonds trade infrequently, determining the prevailing market price in a moving market when there may not have been many or any recent interdealer transactions in the bond can be difficult. Both the FINRA and MSRB rule specify a prescriptive list and priority of factors that dealers must step through in determining prevailing market price under these circumstances, referred to as a “waterfall.” These factors include the prices of any contemporaneous inter-dealer trades, institutional trades, or quotations. If those factors are

²⁹ Securities and Exchange Commission, “Report on the Municipal Securities Market,” (July 31, 2012).

³⁰ SEC Chair Mary Jo White, Intermediation in the Modern Securities Markets: Putting Technology and Competition to Work for Investors (June 20, 2014), available at: <http://www.sec.gov/News/Speech/Detail/Speech/1370542122012>

not available, the rules specify additional factors dealers must review to establish prevailing market price, including prices, or yields calculated from prices, of contemporaneous inter-dealer trades in a specifically defined “similar” security, institutional trades, or quotations;

The rule includes some indicators for determining whether another bond is “similar” to the bond in question. If these factors involving “similar” bonds are not available, the MSRB and FINRA rules specify that dealers must use “economic models” to determine prevailing market price, and if that is unreliable, the dealer should look to customer transactions and make “adjustments” to calculate prevailing market price.

As it should appear, the process for determining prevailing market price on days when the market has moved during the time between transactions is complex, nonspecific and subjective. In a market where many bonds trade infrequently, determining the value of a bond at any point in the day can be both art and science. Experienced bond traders are adept at determining bond prices. However, the overly specific nature and order of the steps prescribed in the rules create very significant compliance burdens, given the shift from a historical focus on a range of reasonableness of markups to the accuracy of a very specific data point derived from subjective analysis. Moreover, there are serious questions regarding the kind of documentation firms must maintain to demonstrate that they followed the waterfall precisely in determining prevailing market price. Perhaps most importantly, the prescriptive yet subjective waterfall does not lead itself to automation in an environment that is increasingly adopting electronic trading with less human intervention. Market participants have asked for more flexibility in the implementation standards but there appears to be an unwillingness to better balance multiple objectives while not significantly compromising the objective of increased transparency. Even in light of the recent guidance, we remain concerned about unintended consequences of the rules. For example, if dealers face unmanageable compliance risks and significant implementation costs, they may reduce their market activity in ways that ultimately diminish market liquidity.

Pre-trade Price Transparency

In its 2012 paper on the municipal securities market, the SEC made two recommendations to enhance “pre-trade” price transparency in the municipal market:³¹

- “The Commission could consider amendments to Regulation ATS to require an alternative trading system (ATS) with material transaction or dollar volume in municipal securities to publicly disseminate its best bid and offer prices and, on a delayed and non-attributable basis, responses to ‘bids wanted’ auctions;” and
- “The MSRB could consider rules requiring a brokers’ broker with material transaction or dollar volume in municipal securities to publicly disseminate the best bid and offer prices on any electronic network it operates and, on a delayed and non-attributable basis, responses to “bids wanted” auctions.”

Both FINRA and the MSRB have been exploring ways to further the development of a pre-trade transparency regime consistent with the above recommendations. SIFMA strongly supports reasonable efforts to improve price transparency in the municipal and corporate securities markets.

³¹ SEC, pages 143-144.

The dealer community has supported the MSRB's Real-time Trade Reporting System (RTRS), the MSRB's EMMA platform, and FINRA's Trade Reporting and Compliance Engine (TRACE). These are the mechanisms for collecting and accessing trade prices and other trade information, but the MSRB systems also provide for the collection of disclosure information and other related municipal market information and data. We continue to support the ongoing development and operation of these systems through the fees our industry pays. However, we are concerned that a pre-trade price transparency regulatory initiative could be expensive to develop and implement while yielding limited useful information for investors. We believe that regulators need to carefully and thoroughly assess the costs and benefits of any pre-trade transparency proposals.

Part of the SEC's analysis leading to its recommendations was based on an academic study published 11 years ago, using data that is now 17 years old.³² Policymakers should be cognizant that the transparency of the market has improved significantly since that time from both further development of the post trade reporting regime and forthcoming regulatory requirements on markup disclosure, as well as by market driven efforts.

While we support improvements to market transparency, we urge the SEC, MSRB and FINRA to allow the best execution and markup disclosure rules to take full effect so as to permit additional time to reevaluate the issue of retail price transparency and trade execution. After monitoring the effect of those rules and with the benefit of the additional observations and data, regulators will be better positioned to weigh the cost and benefits of any initiatives while taking into account the cumulative impact of more recent rule changes.

Securitization Market Overview

Securitized products are bonds that are collateralized by cash flows from transactions such as loans or leases. The issuer of a mortgage-backed security ("MBS") or asset-backed security ("ABS") assembles a pool of assets such as mortgage loans and sells securities to investors backed by the cash flows on the underlying assets. When a homeowner whose mortgage has been securitized makes her monthly mortgage payment, the principal and interest she pays is passed through to MBS investors. The securitization markets funded 60% of consumer lending in 2016.³³

The securitization markets can be generally divided into three distinct but broad markets. The MBS market can be divided into agency and non-agency markets. The agency market is those for MBS issued and/or guaranteed by Fannie Mae, Freddie Mac, or Ginnie Mae. The non-agency market is for MBS issued by private-sector institutions. ABS markets are markets for securitized consumer debt, auto loans and leases, commercial loans and leases, credit cards, and other types of securitizations.

³² Lawrence E. Harris and Michael S. Piwowar, Secondary Trading Costs in the Municipal Bond Market, J.FIN. (June 2006), page 1361.

³³ Federal Reserve Bank of New York, Quarterly Report on Household Debt and Credit, (Feb. 2017).

Agency MBS Market

Agency MBS are MBS issued and/or guaranteed by Fannie Mae, Freddie Mac, or Ginnie Mae. These MBS carry a guaranty of timely payment of principal and interest that is backed by the full faith and credit of the US government in the case of Ginnie Mae, and a significant US Treasury capital commitment in the case of Fannie Mae and Freddie Mac. This means that investors in these markets are not exposed to credit risk – instead, they focus on interest rates and the prepayment risk of the securities. Prepayment risk is the risk that a mortgage borrower will repay some or all of their mortgage before it is due. This can be good or bad for the MBS investor, depending on the price they paid for the bond and the current level of interest rates. Importantly, investors in Agency MBS do not want to be exposed to credit risk – similar to Treasury investors, they are “rates” investors.

The largest portion of the agency MBS market is the “To-Be-Announced” (TBA) market. In a TBA trade, bonds are sold and bought on a forward basis—settlement is typically 30-60 days out from the day of the trade—and the exact identity of securities to be delivered is not known. Securities in the TBA market are subject to “Good Delivery Guidelines” and are considered fungible. Market standards, settlement conventions, and trading practices in the TBA market were developed by market participants under the auspices of SIFMA’s predecessor organization the Public Securities Association, and have been organized and maintained by SIFMA since the early 1980s. There is a separate TBA market for each of Fannie Mae, Freddie Mac, and Ginnie Mae. This may change in 2019 if the Federal Housing Finance Agency (FHFA) and government-sponsored enterprises implement their single-security project, which is designed to merge the Fannie and Freddie TBA markets into one single market.

The TBA markets are very liquid, although less liquid than in prior years. In 2016, an average of \$210 billion of TBA trading took place on a daily basis, second only to US Treasuries, and bid-ask spreads average 4 basis points.³⁴ It attracts investment capital from around the world – foreign investors provide important funding to US mortgage borrowers. The main benefits of this market are: (1) the ability of lenders to provide 30-60 day rate locks to borrowers at low or no cost since they are able to sell loans on a forward basis, locking in prices, (2) the ability of banks to economically underwrite freely prepayable 30 year mortgages, (3) the ability of lenders and servicers to hedge risk, (4) the ability of investors to access liquid, safe, and long-term investment markets, and (5) lower cost of mortgages due to immense liquidity.

TBA market liquidity has declined somewhat in recent years. Factors driving this include the shrinking of balance sheets by capital-constrained dealers, the low interest rate environment, which has driven investors into other higher-yielding sectors, and a FINRA rule requiring most MBS and ABS trades to be reported in real time to FINRA’s Trade Reporting and Compliance Engine (TRACE), which has made harder for participants to transact in larger blocks of securities. The market share of the top 10 dealers in the TBA market is 81%, according to FINRA data.³⁵

There is a significant volume of trading on electronic platforms in the TBA sector particularly among larger dealers. SIFMA members have reported up to 75% or more of TBA trading taking place on an electronic platform. Similarly, some firms have estimated that a significant proportion

³⁴ FINRA, Analysis of Securitized Asset Liquidity, at 12.

³⁵ Id., at 14.

of dealer to customer trading takes place on platforms, possibly as much as half. This trend may vary by institution.

The vast majority of dealer-to-dealer TBA trading is cleared at the Fixed Income Clearing Corporation (FICC). Clearing and settling trades involves the process of matching trade details between two counterparties and moving securities and cash from one owner to another. A smaller proportion of customer trading is directly cleared through FICC, but many customers clear through an FICC participant so that their trading may be netted and cleared. FICC also operates an electronic pool notification system, which is how the majority of market participants notify one another of the actual pools that will be delivered to fulfill the TBA contract.

Non-TBA Agency MBS

The other parts of the Agency MBS market are the specified pool and Collateralized Mortgage Obligation (CMO) markets. The specified pool market is where MBS trade on a specified basis and where the specific security to be delivered at settlement is known at the time of trade. CMOs are structured bundles of Agency MBS.

Liquidity in specified pools and CMOs is far lower than in the TBA market. FINRA reports average daily trading volume of approximately \$20 billion and \$3.3 billion, respectively, for specified pools and Agency CMO.³⁶ There is far less electronic trading in this market than in the TBA market, although some members report increasing electronic trading in specified pools. The market share of the top 10 dealers in the specified pool market is 67%, and in the CMO market 62%, according to FINRA data.³⁷

Non-Agency MBS / Private Label MBS

Non-Agency, or Private Label MBS are MBS issued by private entities such as banks or finance companies. These MBS do not carry a government guarantee, and investors are exposed to both credit risk and prepayment risk. Due to a variety of issues, the non-agency MBS markets have seen very low issuance of securities backed by new mortgage loans since 2007. In 2005-2006, these MBS represented almost half of total MBS issuance, whereas today they represent less than 5% of MBS issued. Today's non-agency MBS new issuance market is defined by securitizations of reperforming loans, defaulted loans, and loans that were originated a number of years ago.

Non-agency mortgage securities markets are far less liquid than TBA. The average age of a non-agency MBS that traded in 2016 was over 10 years,³⁸ which is indicative of the lack of new issuance, and average daily trading volumes are just under \$3 billion.³⁹ The market share of the top 10 dealers in the non-agency MBS market is 67%, according to FINRA data.⁴⁰

³⁶ Id., at 9.

³⁷ Id., at 14.

³⁸ Id., at 6.

³⁹ Id., at 9.

⁴⁰ Id., at 14.

Asset-backed securities

A broad range of cash flowing instruments are securitized in the ABS markets. They range from credit cards and auto loans to trade receivables to equipment loans and leases to the cash flows from entire businesses (i.e. whole business securitization, used by franchises such as Dunkin Donuts and Wendy's). The most liquid sectors are those for debt issued by large, regular issuers of credit card and auto loan debt (e.g., Capital One, Ford Motor Credit), where bid-ask spreads averaged 4 basis points in 2016.⁴¹ All together, about \$2 billion of ABS trade on a daily basis.⁴² The market share of the top 10 dealers in the mainstream ABS sectors (credit cards, auto loan/lease, and student loans) ranges from 83-84%. Other types of ABS see a top 10 share of 74%.⁴³

Securitization Market Policy Questions

It has been estimated that had the capital requirements for securitization been rationalized, the complexity of disclosure been limited to what was reasonable, and other related securitization and lending regulations been similarly tailored, approximately \$1 trillion of additional residential mortgage loans would have been made over the last five years, resulting in 0.5% higher GDP growth in each of those years.⁴⁴

Capital requirements are increasingly risk-insensitive while both capital and liquidity requirements are excessively conservative and do not adequately consider the effects on financial market activity. There are a number of flaws in the capital and liquidity rules covering securitization, the overall effect of which has been to diminish the participation by banking institutions in the securitization process both as investors and as originators, thereby decreasing the availability of funding to the real economy. These include the CCAR rules for calculating capital to address defined shocks to the system for securitizations are excessive and should be revised for securitization positions. In addition, the recent Basel III revisions to securitization capital requirements that have not yet been applied to the risk-based capital requirements in the United States, should not be adopted, or, if they are adopted, their deficiencies should be addressed so that in either case the U.S. risk-based capital requirements for both the banking book and trading book are more rational.

Under the rules as now written, required capital may exceed the maximum possible loss on the position, i.e., a total write-off. GSE MBS and asset-backed securities should receive more equitable treatment under the LCR. If capital requirements were rebalanced, and securitization's liquidity characteristics more sensibly recognized, growth and employment would follow without any material diminution in safety or liquidity.

⁴¹ Id., at 12.

⁴² Id., at 9.

⁴³ Id., at 14.

⁴⁴ Letter from Jamie Dimon, Chair of the Board and CEO, JP Morgan Chase, to shareholders, April 4, 2017.

Regulation AB II

Regulation AB II is overly burdensome and has effectively shut down registered markets for non-agency residential mortgage-backed securities and has significantly curtailed registered issuance for smaller or more infrequent asset-backed securities issuers. While private offerings—unregistered, often relying upon Rule 144A—remain viable, they face the risk of proposed similar regulation and, by definition, are constrained sources of capital and funding since the investor base is far smaller than that for registered transactions. This regulation has effectively constrained real economy activity that public offerings of securitization transactions could more efficiently fund.

Credit Risk Retention Rules

The credit risk retention rules are very lengthy, detailed, and complex yet fail to adequately reflect important characteristics of the different kinds of securitization transactions that finance distinct asset classes, such as mortgage loans, auto loans, and commercial loans. In some cases, the rules require an excessive amount of risk retention by failing to make any adjustment for the related funding and non-credit risks, for example, market and interest rate risk, or to give appropriate credit for other forms of risk retention. The rules are overly prescriptive regarding the manner in which the required retention must be held and for many asset classes require that the retention be held well beyond the period in which weak underwriting, or other similar moral hazard, would be expected to become evident.

Margin Requirements for Uncleared Swaps

Many securitization transactions employ swaps to match or hedge the cash flows that arise from the assets that collateralize the transaction to those which are required to be paid to investors in the liabilities issued by the transaction. These regulations fail to reflect the fact that special purpose entities are different from typical counterparties on flow-traded swaps. Special purpose entities are not operating companies, and they contain special structural features designed to mitigate counterparty risk. As a practical matter, special purpose entities will find it difficult if not impossible to comply with the margin and clearing requirements as implemented and will either have to forego derivatives and their risk mitigating benefits or find a way to comply which will not be efficient for the transaction. Either way, the rules will have a harmful effect on the cost and availability of securitization as a financing tool hindering the vibrancy of the financial markets.

Qualified Mortgage Standards

While the CFPB published the lengthy and detailed QM rules and their Appendix Q in an effort to provide guidance to lenders on how to underwrite loans in compliance with the law, the practical impact has been that the requirements are complex, inflexible and fail to properly take into account differing circumstances of particular types of borrowers. At the same time, despite their complexity, the rules and their appendix lack important clarity on critical aspects of the lending process. For example, how a lender may rely on borrower bank statements or document the income of self-employed borrowers remains unclear years after the rules were enacted. Lenders, securitizers and investors have found it difficult to obtain written guidance on these and similar issues upon which they can be comfortable relying.

Volcker Rule Impact on Securitization

The agencies responsible for implementing the Volcker Rule created an overly inclusive definition of covered fund that subjects many securitization entities to the Volcker Rule's restrictions, even though they are clearly not private equity or hedge funds. The compliance burden for banking organizations that hold or trade securitization transactions is significant, with no or few corresponding benefits. We believe the Volcker Rule's definition of covered fund should be narrowed to ensure that only those investments (particularly in hedge funds and private equity funds) intended by Congress to be captured are captured.

TLA-RESPA Integrated Disclosure Rule (TRID)

TRID is the CFPB's rule which combines the previously separate TILA and RESPA disclosure forms. It is very detailed and prescriptive, yet unclear. Lingering misperceptions and technical ambiguities in the regulations have resulted in significant market disruptions. Many market participants are reporting very high TRID fail rates on closed loans delivered for sale. Moody's recently reported that approximately 90% of one sample of loans did not fully comply with TRID requirements.⁴⁵ If these conditions persist, many lenders will experience liquidity issues as unsold or repurchased loans clog warehouse funding lines and balance sheets. Further, although some lenders may have multiple investor options, investors often have different standard for TRID compliance. As a result, originators are not always able to deliver loans to the investor with the best price, and hence the best rate for the consumer, and instead must deliver based on investors' TRID interpretations. For consumers, these dynamics will increase both the costs of origination and the interest rates they pay.

Conclusion

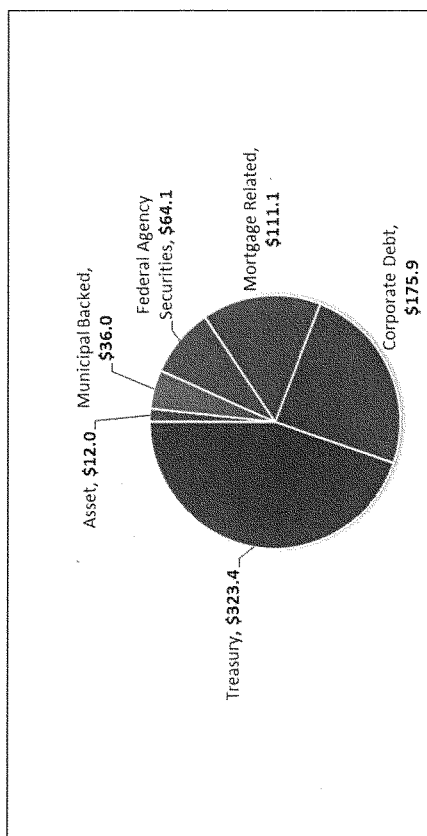
Traditional bank lending often receives considerable consideration by policymakers, much of it appropriate. But to exclusively focus on those policy questions ignores the more significant source of financing that drives our economy—our capital markets. Bonds finance everything from home mortgages and car loans to highways and schools to factories and equipment as well as the very federal government itself. The bond markets set interest rates for commercial and consumer lending and provide a safe and predictable investment for millions of Americans.

While the fixed income markets are fundamentally healthy today, there are significant uncertainties about whether our economy is operating at full efficiency. Most important, a plethora of financial regulations has been adopted since the crisis and the cumulative effects have not been measured or analyzed sufficiently. In the fixed income markets, liquidity depends on the ability and willingness of dealers to commit capital to market making. Accordingly, policymakers need to calibrate existing and future rules to ensure they do not unduly impede the ability of the market to provide the capital needed to finance strong growth in the economy.

⁴⁵ Moody's Investor Service, U.S. Mortgage Lenders Face Difficulties Complying with New Rules, a Credit Negative for RMBS, December 10, 2015.

We appreciate the opportunity to present our views and we look forward to working with the Congress, the Administration, and the independent agencies and regulators to help ensure that the bonds markets continue to perform their vital functions and operate safely and efficiently to move America forward.

Figure 1. Issuance in the U.S. Bond Markets, May 2017 (in \$ billions)



Source: SIFMA



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July 18, 2017

The Honorable Bill Huizenga
Chairman
Subcommittee on Capital Markets, Securities, and Investment
2129 Rayburn House Office Building
Washington, DC 20515

The Honorable Carolyn B. Maloney
Ranking Member
Subcommittee on Capital Markets, Securities, and Investment
4340 Thomas P. O'Neill, Jr. Federal Building
Washington, DC 20515

Re: Hearing entitled "A Review of Fixed Income Market Structure"

Dear Chairman Huizenga, Ranking Member Maloney, and Members of the Subcommittee,

The Depository Trust & Clearing Corporation ("DTCC")¹ appreciates the Subcommittee on Capital Markets, Securities, and Investment's ("Subcommittee") oversight and interest in the fixed income market. The Subcommittee's hearing entitled "A Review of Fixed Income Market Structure" ("Hearing") was timely and raised important issues about the fixed-income markets. As an integral part of those markets, DTCC is submitting this letter to address some of the issues raised in the Hearing related to the U.S. Treasury market. We also understand that the Subcommittee is planning subsequent hearings on these important topics, and we look forward to continuing a constructive dialogue with the committee in order to share our views and inform the Subcommittee to help ensure changes that serve the marketplace as a whole and the public.

DTCC's wholly-owned subsidiary, the Fixed Income Clearing Corporation ("FICC"),² is a critical part of the U.S. Treasury market. FICC is a clearing agency registered with the

¹ DTCC provides critical infrastructure to serve all participants in the financial industry, including investors, commercial end-users, broker-dealers, banks, insurance carriers, and mutual funds. DTCC operates as a cooperative that is owned collectively by its users and governed by a diverse Board of Directors. DTCC's governance structure includes more than 300 shareholders.

² FICC is designated as a systemically important financial market utility ("SIFMU") pursuant to Section 805 of Title VIII of the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 ("Dodd-Frank") in recognition of its critical role in the national financial infrastructure.



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Securities Exchange Commission (“SEC”). It provides central counterparty (“CCP”) services to its customers in the U.S. government securities market, which includes facilitating the submission, comparison, risk management, netting and settlement of Treasury securities transactions.

As the primary CCP for Treasury securities, FICC is committed to maintaining the safety, soundness and resiliency of this critical market. We agree with the Subcommittee that requires having and adjusting to market changes in a responsible manner for the benefit of the entire system. Likewise, the rules promulgated by the SEC for Covered Clearing Agencies – the registration category for FICC – are designed to ensure appropriate risk-management standards and safeguards are being met by all CCPs serving the U.S. cash markets.

Within this framework, DTCC is committed to responding to market-structure changes in the Treasury securities market to meet our customers’ needs and serve the interests of the marketplace as a whole. Toward this end, DTCC has expended considerable effort, especially in recent years, to expand access to clearing for more and different types of market participants across asset classes. These efforts serve as evidence of DTCC’s commitment to tailor clearing and settlement services that respond to market demands.

FICC has launched recently two initiatives that should expand access to clearing, and its associated benefits, while building on existing risk safeguards at FICC and among its members. First, FICC submitted – and the SEC issued an order approving – a rule change that expands the types of entities that are eligible to participate in FICC as Sponsored Members.³ Previously, to become a Sponsored Member an entity was required to be a registered Investment Company under the Investment Company Act of 1940, be a “qualified institutional buyer” (“QIB”),⁴ and have at least one Sponsoring Member willing to sponsor the entity.⁵ FICC eliminated the requirement that a Sponsored Member be a registered Investment Company and clarified that a firm whose entity type does not fall clearly into one of the enumerated categories in Rule 144A’s QIB definition may still qualify for Sponsored Membership so long as it meets the financial requirements listed in paragraph (a)(1)(i) of Rule 144A of the Securities Act of 1933.⁶

³ Securities and Exchange Act Release No. 34-80563 (March 1, 2017) (SR-FICC-2017-003). The FICC Rulebook defines “Sponsoring Member” and “Sponsored Member” in Rule 3A. Generally, a Sponsoring Member is permitted to submit to FICC for comparison, novation and netting certain types of eligible transactions between itself and its Sponsored Members. The Sponsoring Member is required to establish an omnibus account at FICC for all of its Sponsored Members’ FICC-cleared activity, which is separate from the Sponsoring Member’s regular netting account. For operational and administrative purposes, FICC interacts solely with the Sponsoring Member as agent for purposes of the day-to-day satisfaction of its Sponsored Members’ obligations to FICC.

⁴ QIB is defined in Rule 144A of the Securities Act of 1933.

⁵ *Id.* at 2-3.

⁶ *Id.*



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Critically, this expansion of Sponsored Member eligibility did not alter risk management practices applicable to Sponsoring Members.⁷

Second, FICC also sought approval to broaden the clearing of tri-party repurchase agreement (“repo”) transactions.⁸ The SEC recently approved a change to FICC’s rulebook broadening the pool of entities that would be eligible to submit tri-party repo transactions for central clearing at FICC.⁹ Specifically, FICC established the “Centrally Cleared Institutional Tri-Party Service” or the “CCIT™ Service.”¹⁰ To effectuate the proposed CCIT Service, FICC created a new limited service membership category for institutional cash lenders.¹¹ The SEC approved this rule change as well.¹²

These examples illustrate the progress being made to modernize the existing Treasury-security marketplace in a manner that is consistent with the SEC’s and Congress’ broad policy goals. But there is more to do.

The U.S. Treasury Department issued a Request for Information (“RFI”) last year asking stakeholders for their views about the Treasury market structure, including the growing presence of principal trading firms (“PTFs”) in the Treasury securities markets.¹³ As DTCC and others shared in that context, unlike the trades of Treasury securities between bank dealers, PTFs’ trading activity typically is not cleared by a CCP, such as FICC.¹⁴ This bifurcates the Treasury market, with a growing percentage of the market being bilaterally cleared by PTFs, while much of the bank-dealer trading activity continues to clear at FICC.¹⁵

⁷ *Id.* at 17.

⁸ Repo transactions involve the sale of securities along with an agreement to repurchase the securities on a later date. Bilateral repo transactions involve a cash lender (e.g., a money market mutual fund, pension fund, or other entity with funds available for lending) and a cash borrower (typically a broker-dealer, hedge fund, or other entity seeking to finance securities that can be used to collateralize the loan). In the opening leg of the repo transaction, the cash borrower receives cash in exchange for securities equal in value to the amount of cash received, plus a haircut. In the closing leg of the repo transaction, the cash borrower pays back the cash plus interest in exchange for the securities posted as collateral. In tri-party repo transactions, a clearing bank tri-party agent provides to both the cash lender and the cash borrower certain operational, custodial, collateral valuation, and other services to facilitate the repo transactions.

⁹ Securities and Exchange Act Release No. 34-80574 (May 2, 2017) (SR-FICC-2017-005).

¹⁰ *Id.* at 3.

¹¹ *Id.*

¹² *Id.* at 15.

¹³ *Id.*

¹⁴ DTCC RFI Comment Letter (March 18, 2016) at 2.

¹⁵ *Id.*



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In the response to the RFI, market participants from across the financial sector generally expressed broad support for greater clearing of Treasury securities transactions.¹⁶ Greater clearing of Treasury securities would provide several benefits, including the reduction of aggregate counterparty and credit risk in the system; increased transparency; more efficient use of collateral; and increased balance sheet relief for CCP members.

To address these challenges, DTCC has been in active dialogue with its various stakeholders from the marketplace as well as the official sector. Among FICC's members, the legal structure and risk profile of PTFs would be relatively unique and do not fit neatly into FICC's traditional categories of Clearing Members or Sponsored Members. Nonetheless, DTCC is committed to finding a solution to expand the clearing of Treasury securities in a manner that adheres to the framework established by both Congress and the SEC, and that would help deliver the policy goals envisioned by the official sector and market participants alike.

We appreciate the opportunity to comment on these important issues. We hope we can be a resource to the Subcommittee going forward. Please let us know if you have any questions or comments.

Sincerely,

Murray Pozmanter
Managing Director
Head of Clearing Agency Services

¹⁶ Remarks by Acting Assistant Secretary for Financial Markets Daleep Singh at the SIFMA Fixed Income Market Structure Seminar (May 24, 2017) (available at <https://www.treasury.gov/press-center/press-releases/Pages/jf0465.aspx>).